AD-A186 263 SERVICE VESSEL ANALYSIS VOLUME 2 DETAILED DISTRICT PLOTS(U) TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MA G J SKALIOTIS SEP 87 DOT-TSC-CG-87-V2 1/2

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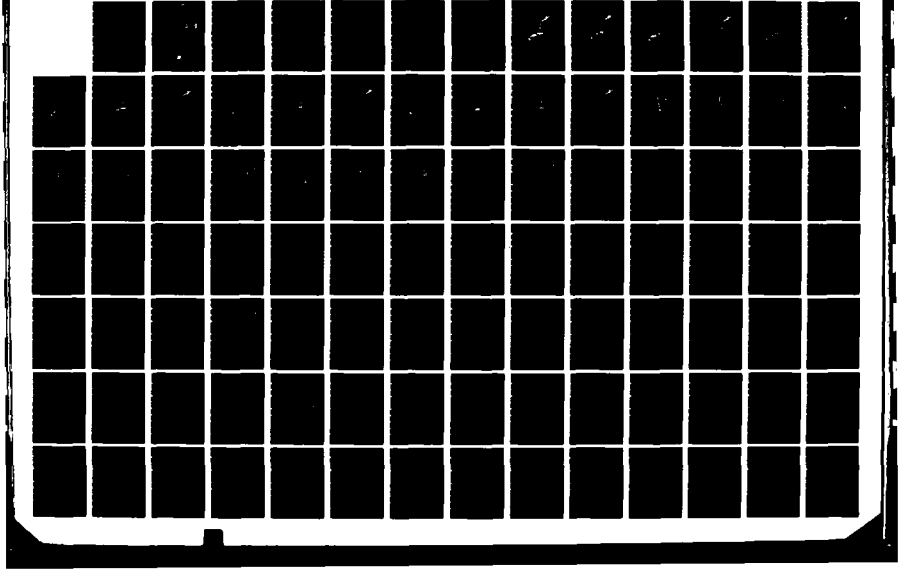

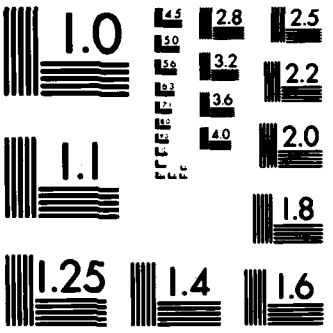

DOT-CG-N-1-87, II
DOT-TSC-CG-87-2, II

SERVICE VESSEL ANALYSIS
VOL. II: DETAILED DISTRICT PLOTS

George J. Skaliotis, Ph.D.

Transportation Systems Center
Cambridge, MA 02142

Final Report
September 1987

U.S. Department
of Transportation
United States
Coast Guard

Office of Navigation
Washington, DC 20593

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15. Supplementary Notes

16. Abstract

This is a supplement to Service Vessel Analysis, Vol. I: Seagoing and Coastal Vessel Requirements for Servicing Aids to Navigation. The material included is not intended to stand alone but is prepared for use in conjunction with the original study

The analysis in Vol. I determines the number, mix, and home ports of vessels required to replace the aging fleet of WLB (seagoing) and WLM (coastal) buoy tenders currently servicing aids to navigation. Case studies were made with differing values of vessel speed, discrepancy response and other mission activity. The Service Force M (SFM) model is a computer implemented simulation which models the activities of vessel servicing aids to navigation. Given a list of navigation aids which are assigned to available servicing vessels, the model simulates, for each vessel, the annual servici of those aids and reports the resulting vessel performance.

This analysis makes no recommendations but a possible scenario would suggest a replacement fleet of 31 vessels (17 seagoing, 14 coastal vessels), reducing the curre fleet by 9 vessels. Determination of such savings might not have been obvious without the use of this modeling analysis technique.

This document contains graphic plots of aid to the vessel assignments used in this study.

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Buoy Tenders, Navigation, Simulation, Vessel Replacement	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22161

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PREFACE

This study of the replacement vessel requirements for servicing aids to navigation was performed by the Transportation Systems Center (TSC) for the United States Coast Guard, Office of Navigation. It is delivered as part of Project Plan Agreement CG-775 to the Short Range Aids Division (G-NSR-2). The Coast Guard project managers have been LCDR H. H. Sharpe and LCDR A. R. Stiles Jr. The significant contributions of LCDR Stiles toward chapter 3 and for description of the acquisition process are appreciated. The intensive activity of obtaining and verifying accurate data describing thousands of aids to navigation throughout the Coast Guard as well as the need for a thoroughly coordinated study approach has provided the opportunity for an unusually close working relationship between TSC and the Coast Guard project managers. The author gratefully acknowledges the guidance, support, and pleasing nature of this relationship.

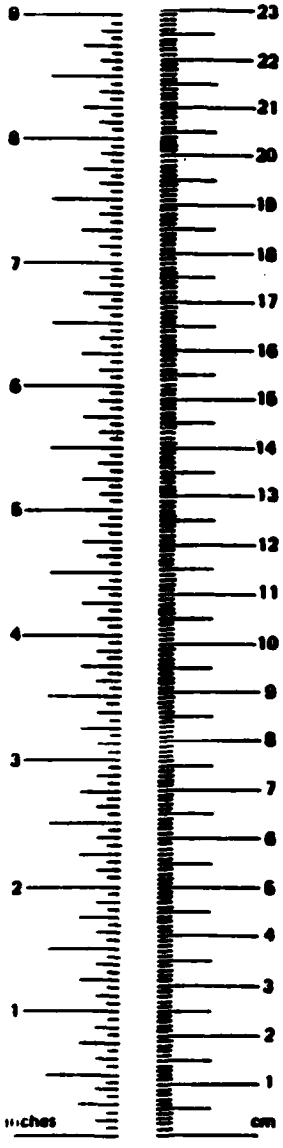
All of the TSC data entry, computer model runs and hand entry of data for and plotting of aid assignments shown in Volume II of this document were cheerfully and tirelessly performed by Kathleen Murphy.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

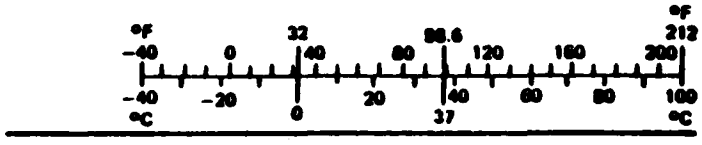
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in. = 2.54 cm (exactly). For other exact conversions and more detail tables see NBS Misc. Publ. 286, Units of Weights and Measures. Price $2.25 SD Catalog No. C13 10 286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	36	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



INTRODUCTION

This document is a supplement to the Service Vessel Analysis. It contains plots of aid assignments used in conjunction with the analysis. This material was separated from the main text because of its volume and the less direct nature of its content. This document is not intended to stand alone. Rather, it is a companion to the original study to which the reader is referred. The description below is repeated from Appendix E in the original document.

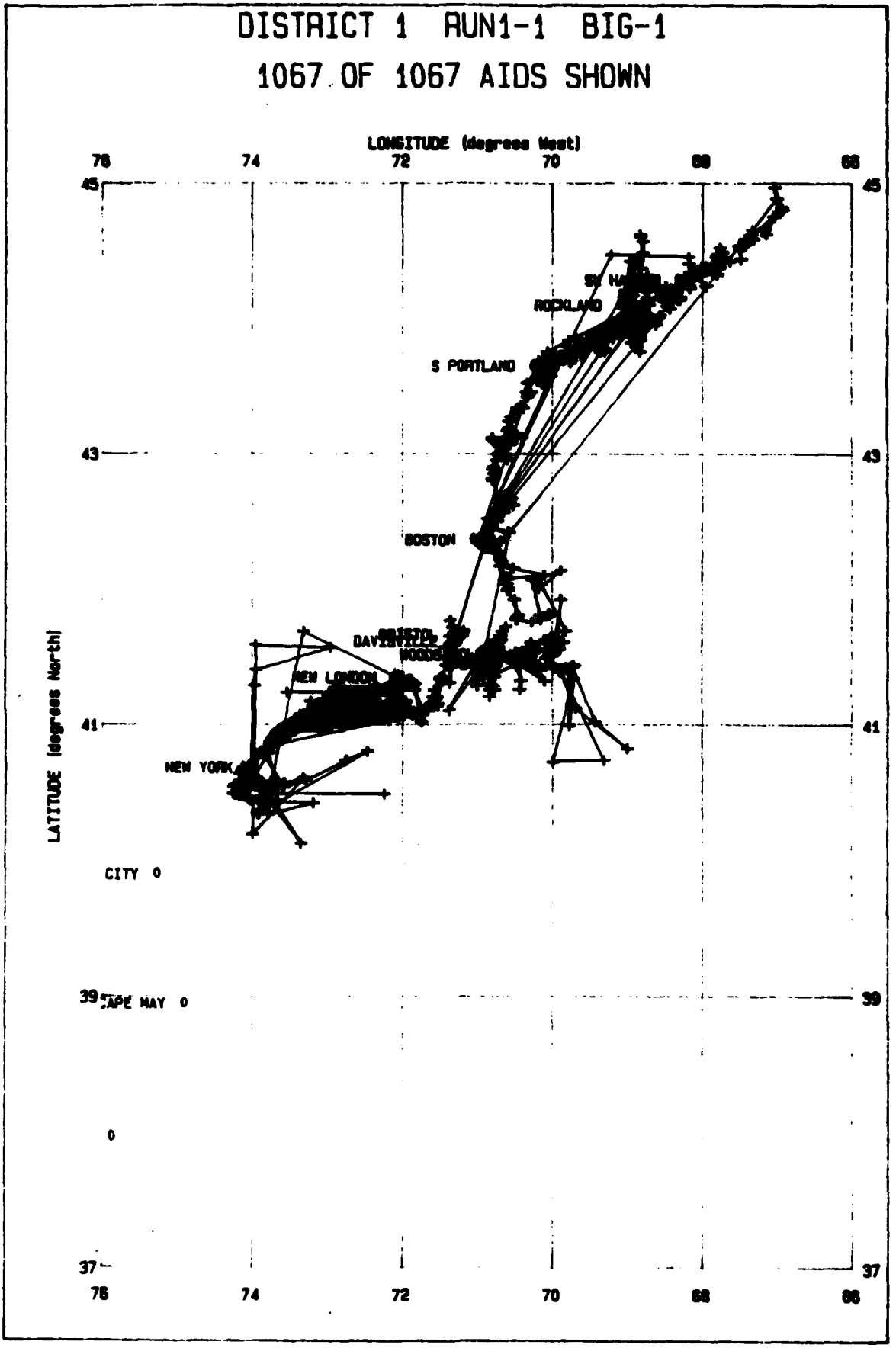
DESCRIPTION OF DETAILED DISTRICT PLOTS

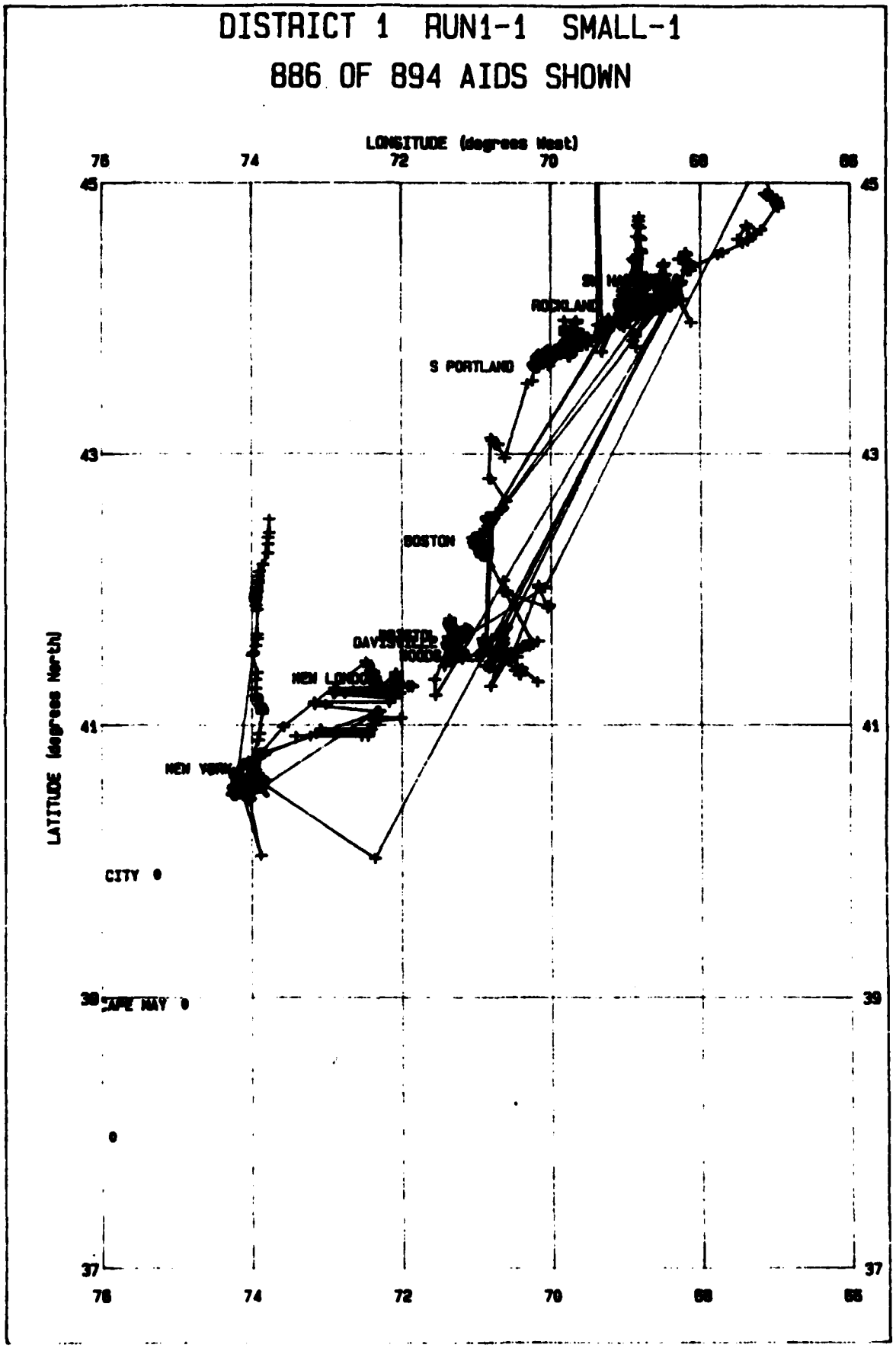
As part of the process of verifying that assignments of aids to servicing vessels was reasonable, plots were developed representing the aids assigned to vessels. This section contains those plots. They are given in District order and within each District, they are shown in order of increasing numbers of District vessels. Each plot has an identifying heading which shows the district, run number and vessel name. The run number may be interpreted as follows. The example of "RUN2a-1" means there were 2 seagoing vessels and 1 coastal vessel assigned to the District. The "a" next to the "2" indicates this is the case where an alternative setup "a" was run of the 2 seagoing vessels. The vessel name of "big-1" indicates that this plot is only for seagoing vessel "1" and "small-2" would indicates that this plot is only for coastal vessel "2".

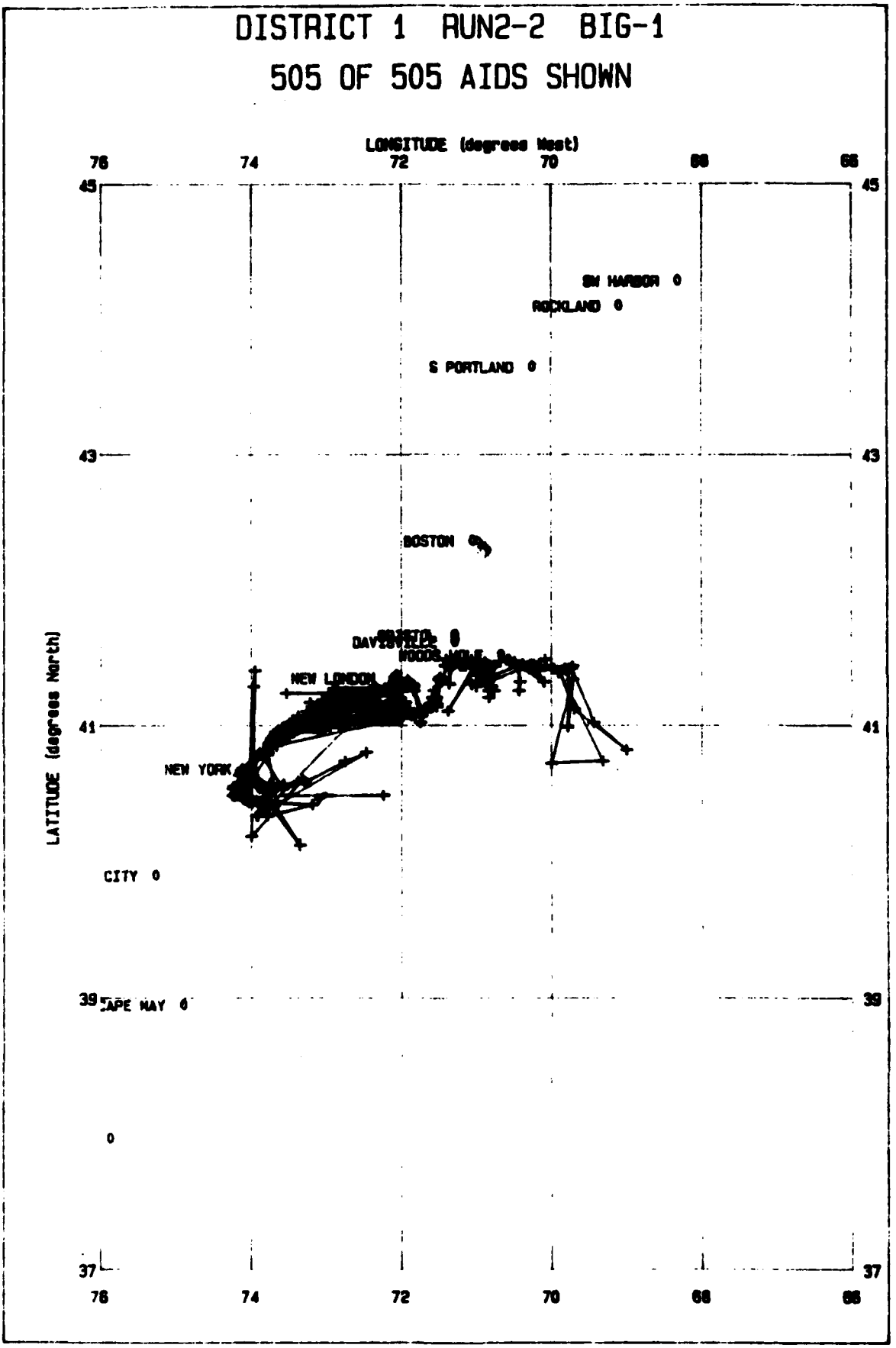
In addition to the heading, the number of aids plotted and shown are given. In cases where these two numbers are different, the difference is attributable to those aids which, due to their location, were outside the boundaries of the given map.

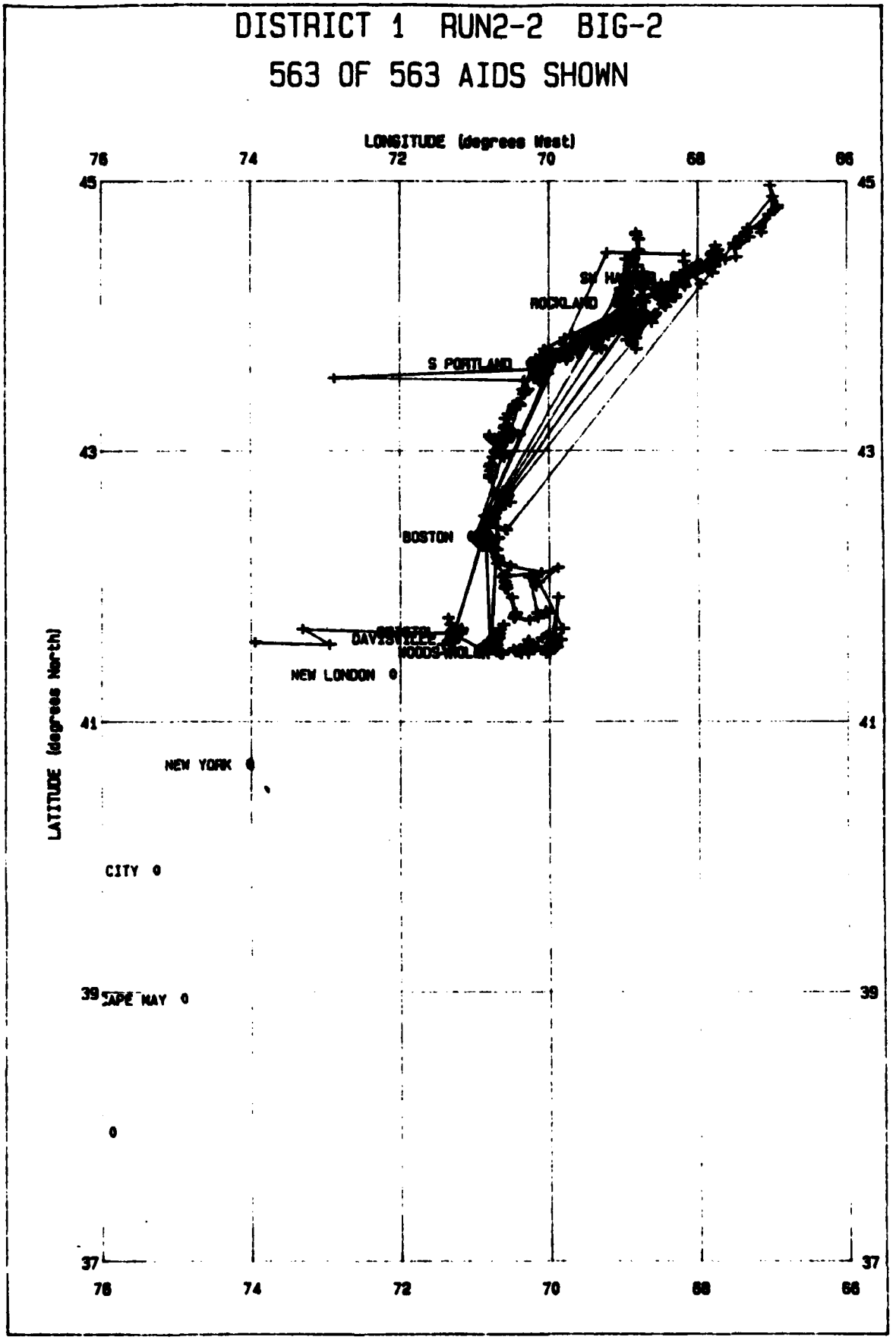
Each plot shows latitudes, longitudes, and all home ports within the boundaries (even if the ports are not in the same District). Each aid is plotted with a "+". The pen is left down between aids to that vessel track lines are also plotted. For each District, the first plot is "RUN1-1". This shows all the aids in the district for either the seagoing or coastal vessels on a single page. This helps to establish that the ordering on the aid list does not cause excessive zigzag vessel travel.

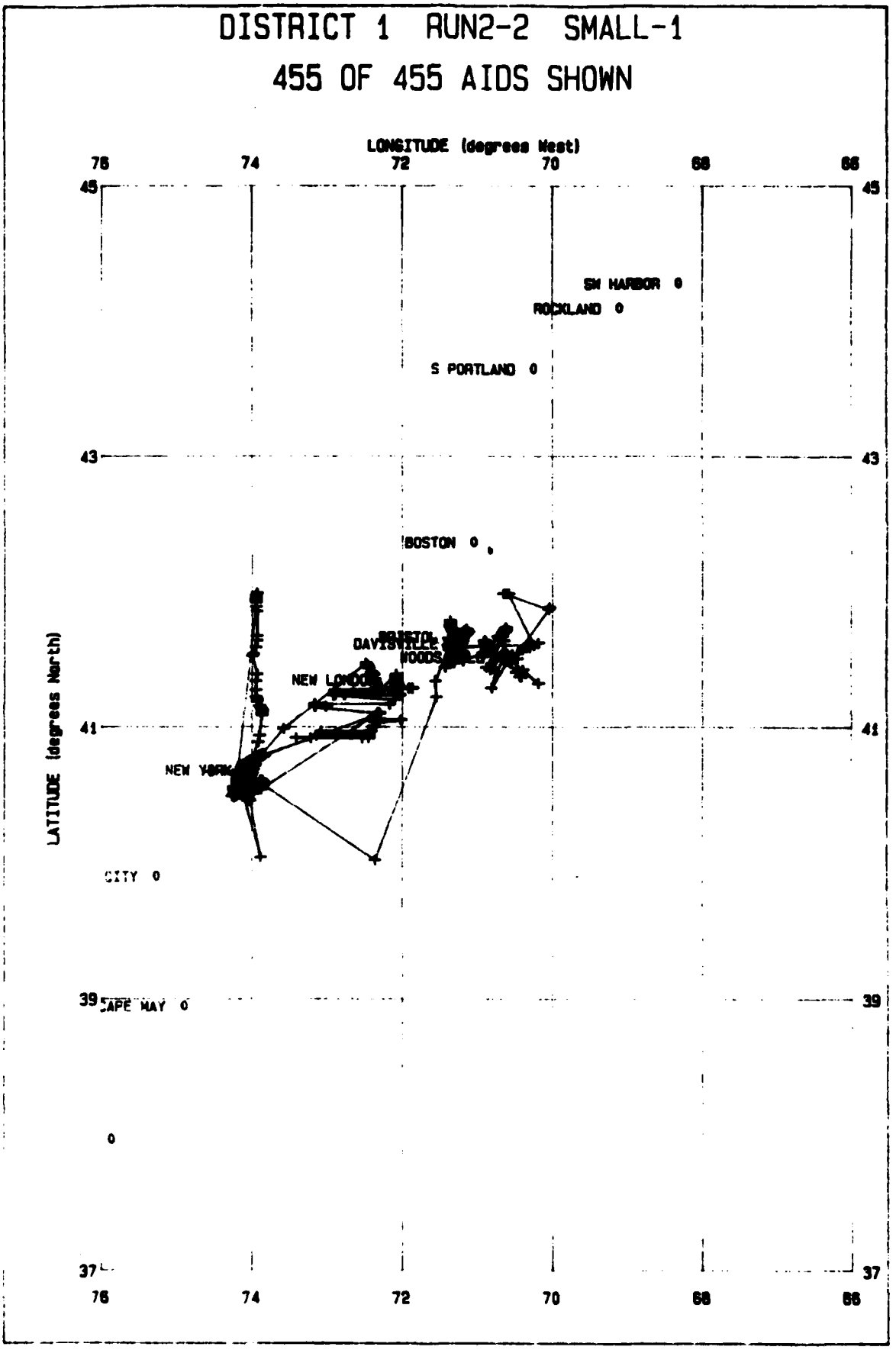
Other plots for the Districts show the cases run for other numbers of vessels. The runs shown are representative of each of the numbers of vessels run for the Districts. Not all of the minor changes which may have been run were plotted.

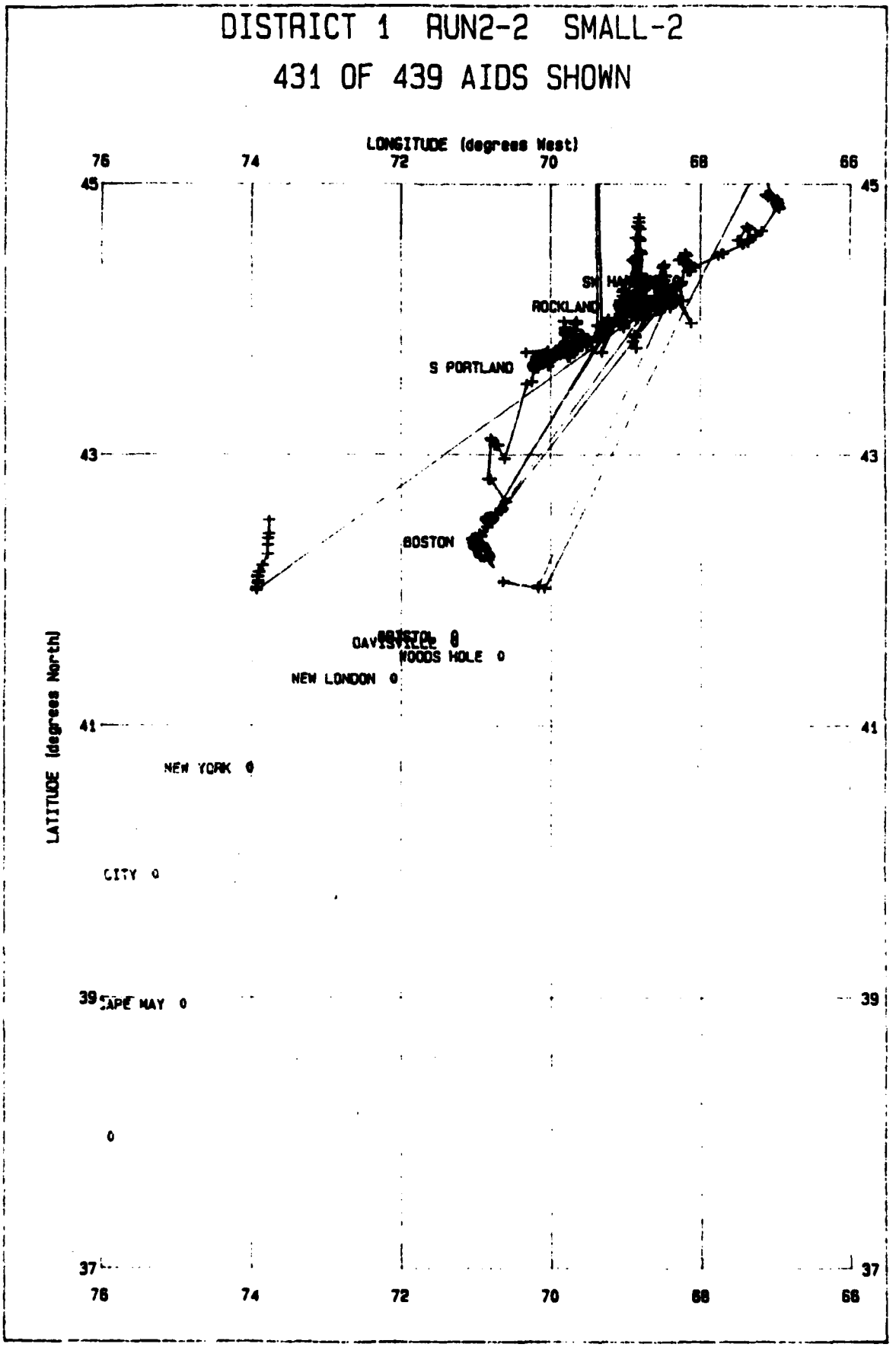

DISTRICT 1 RUN1-1 BIG-1
1067 OF 1067 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
ROCKLAND
S PORTLAND
BOSTON
NEW LONDON
NEW YORK
CITY 0
CAPE MAY 0
0

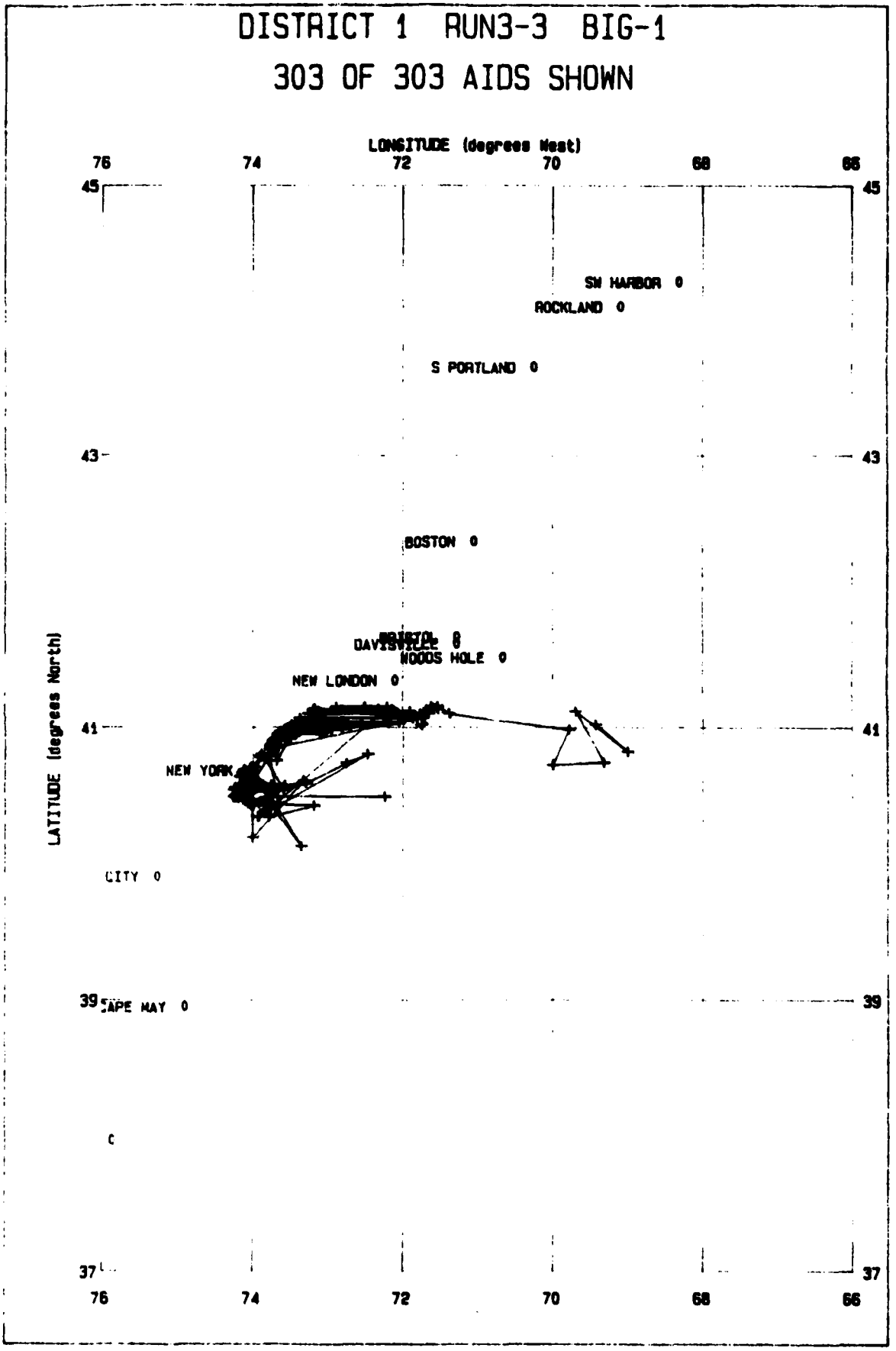

DISTRICT 1 RUN1-1 SMALL-1
886 OF 894 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
S PORTLAND
BOSTON
NEW LONDON
NEW YORK
CITY 0
CAPE MAY 0

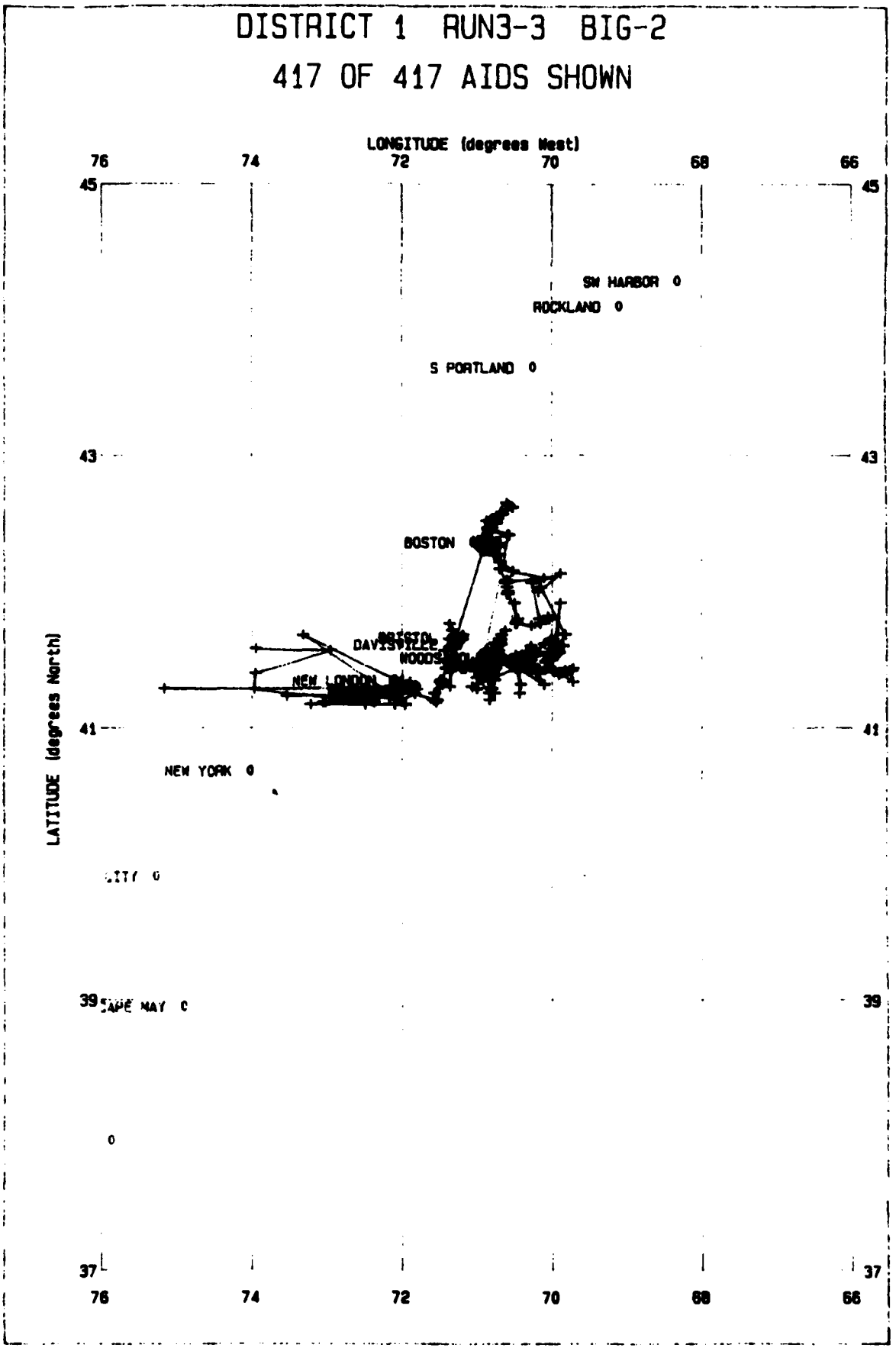

DISTRICT 1 RUN2-2 BIG-1
505 OF 505 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
BM HARBOR 0
ROCKLAND 0
S PORTLAND 0
BOSTON 0
NEW LONDON
NEW YORK
CITY 0
CAPE MAY 0
0

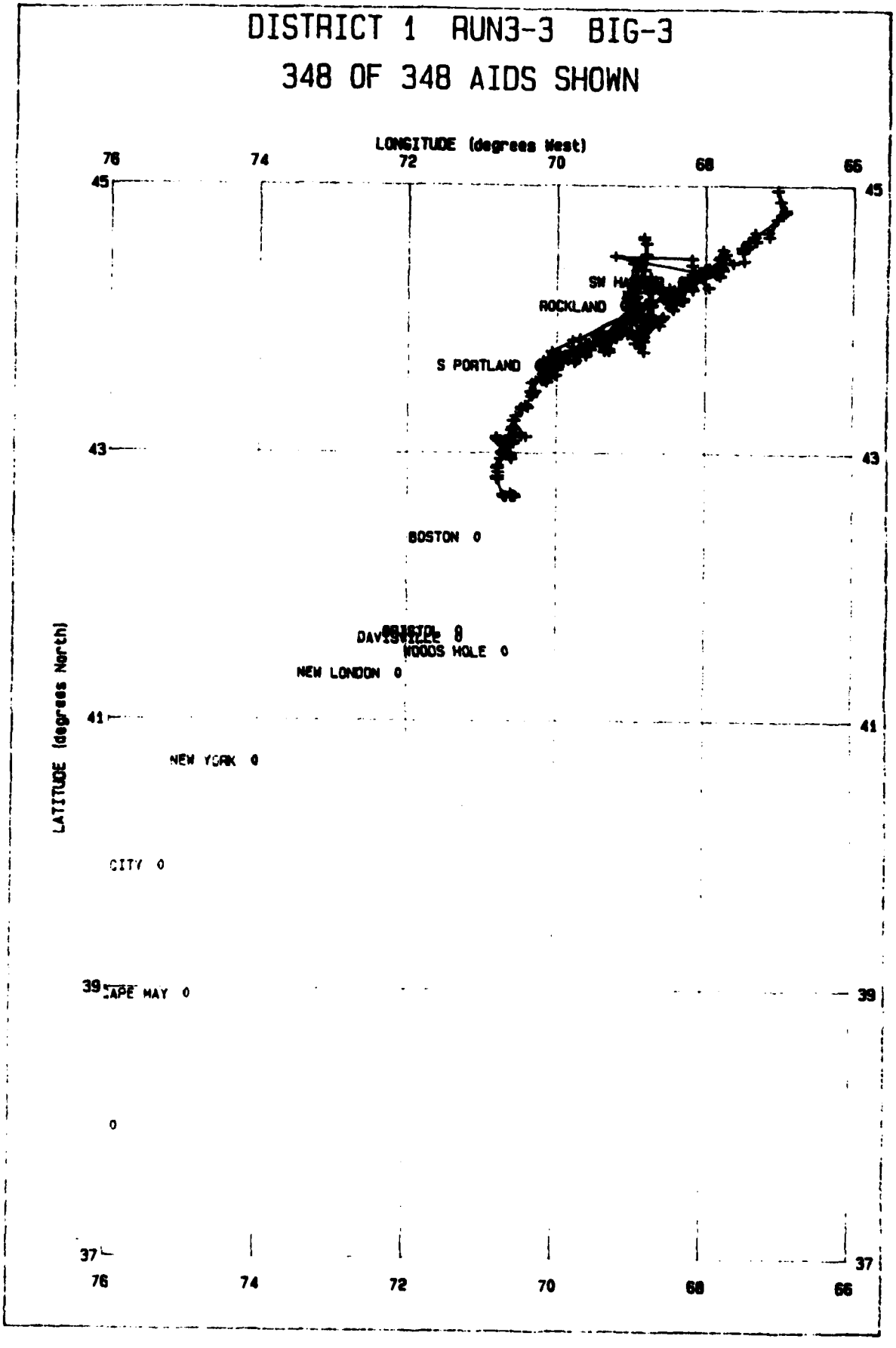

DISTRICT 1 RUN2-2 BIG-2
563 OF 563 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
ROCKLAND
S PORTLAND
BOSTON
NEW LONDON
NEW YORK
CITY
CAPE MAY

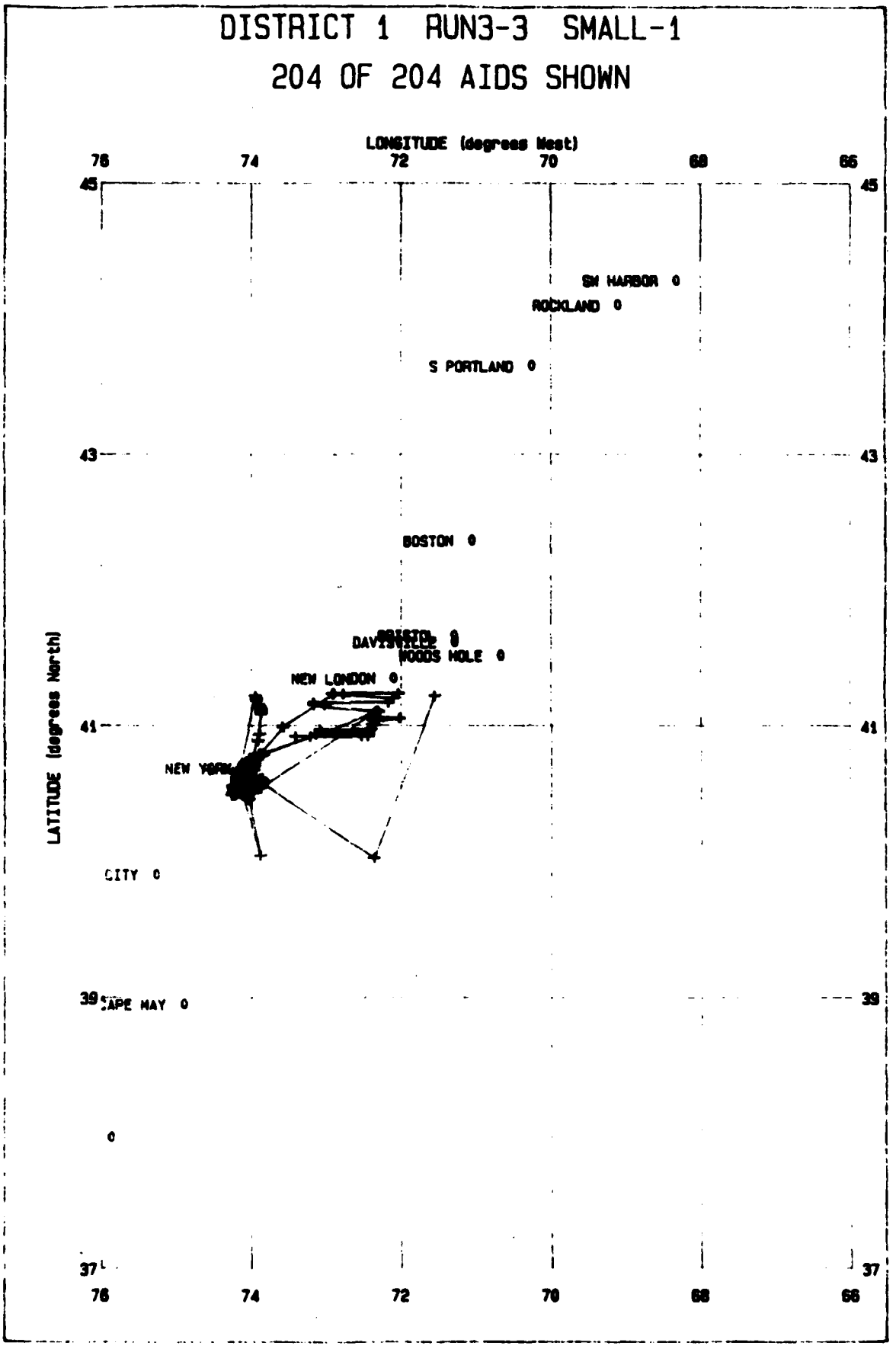

DISTRICT 1 RUN2-2 SMALL-1
455 OF 455 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
SW HARBOR 0
ROCKLAND 0
S PORTLAND 0
BOSTON 0
NEW LONDON
NEW YORK
CITY 0
CAPE MAY 0
0

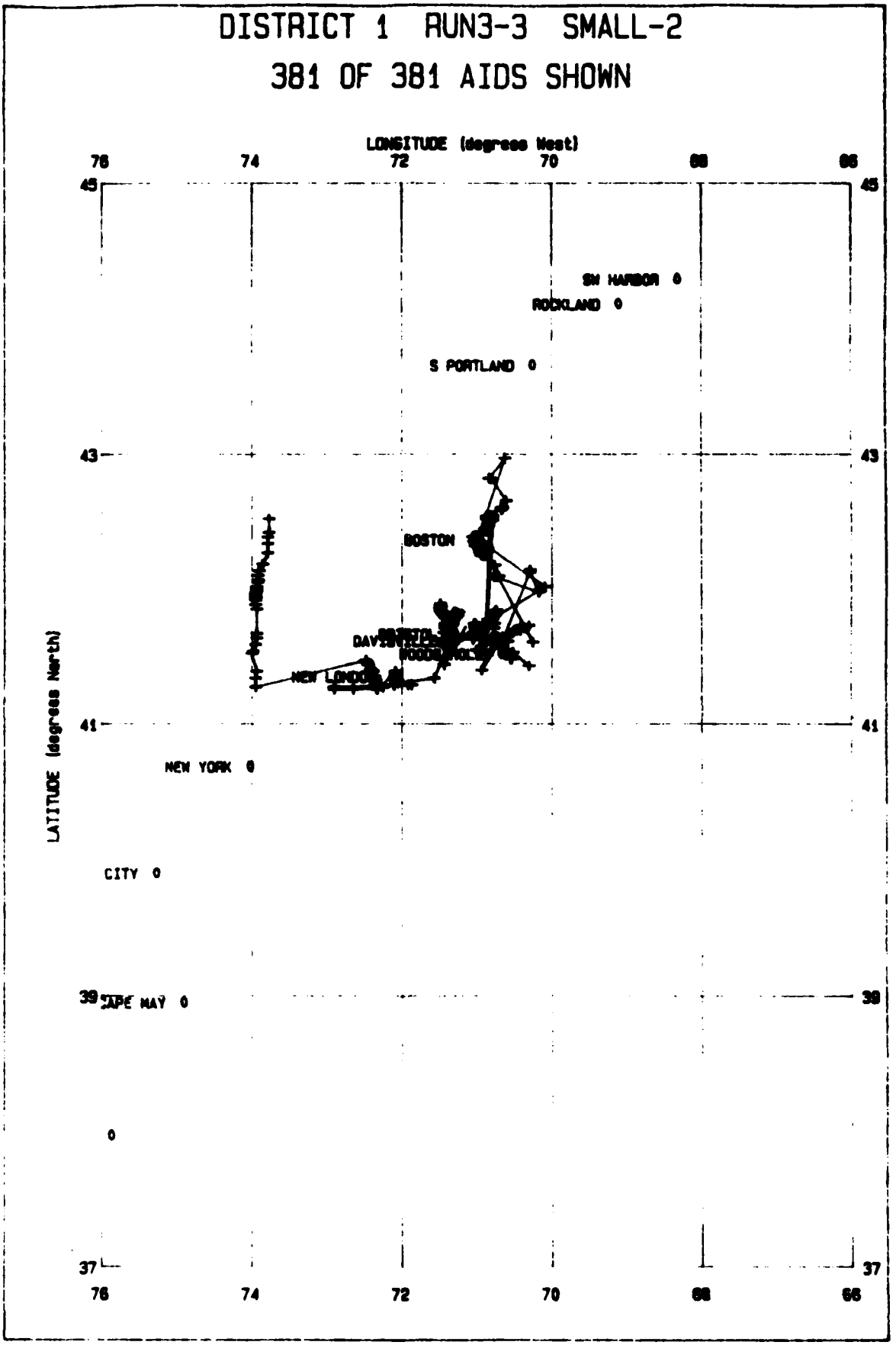

DISTRICT 1 RUN2-2 SMALL-2
431 OF 439 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
ROCKLAND
S PORTLAND
BOSTON
NEW LONDON
NEW YORK
CAPE MAY

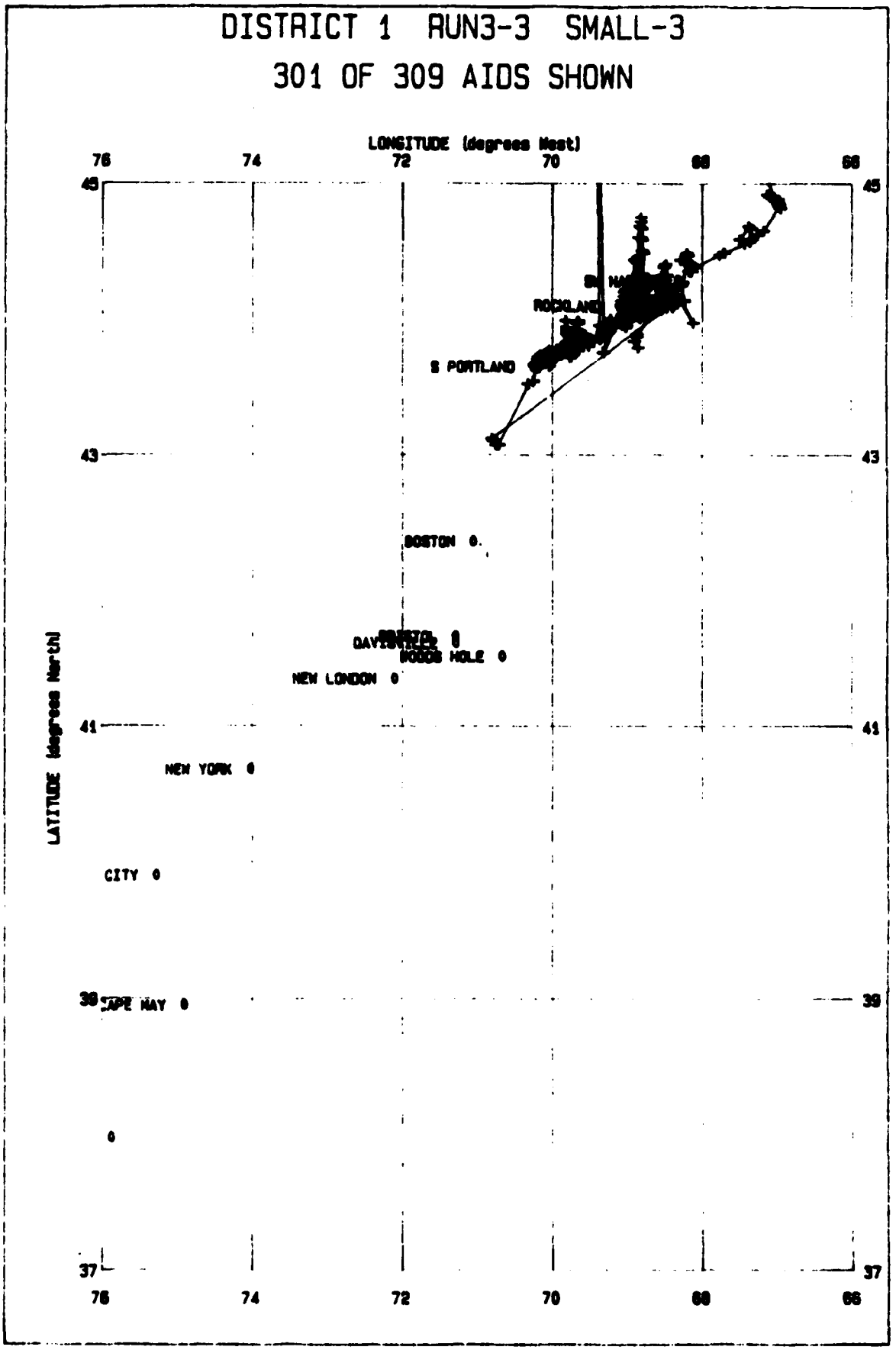

DISTRICT 1 RUN3-3 BIG-1
303 OF 303 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
SW HARBOR 0
ROCKLAND 0
S PORTLAND 0
BOSTON 0
DAVISVILLE 0
WOODS HOLE 0
NEW LONDON 0
NEW YORK
CITY 0
CAPE MAY 0

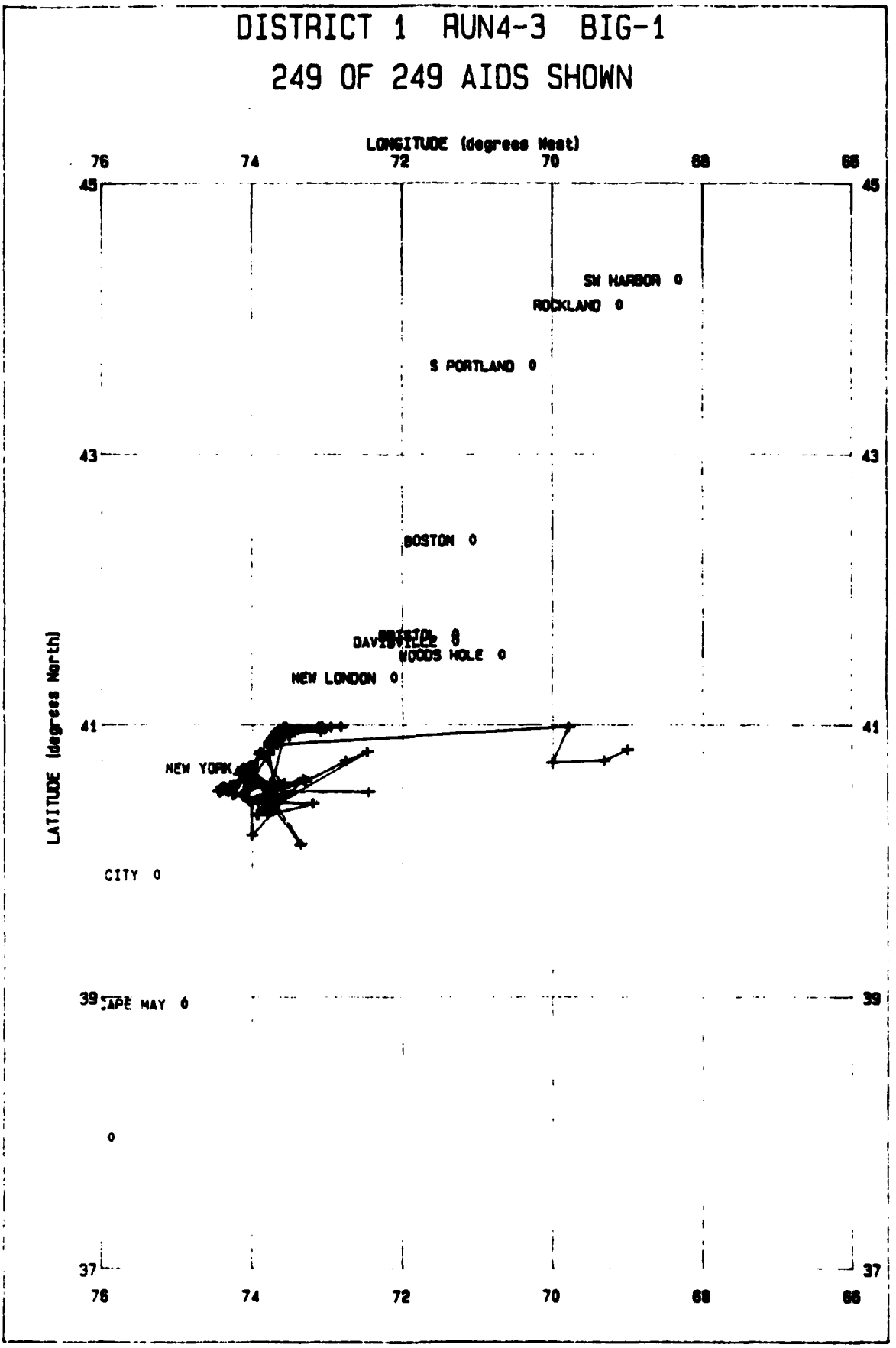

DISTRICT 1 RUN3-3 BIG-2
417 OF 417 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
SW HARBOR 0
ROCKLAND 0
S PORTLAND 0
BOSTON
NEW YORK 0
CAPE MAY 0

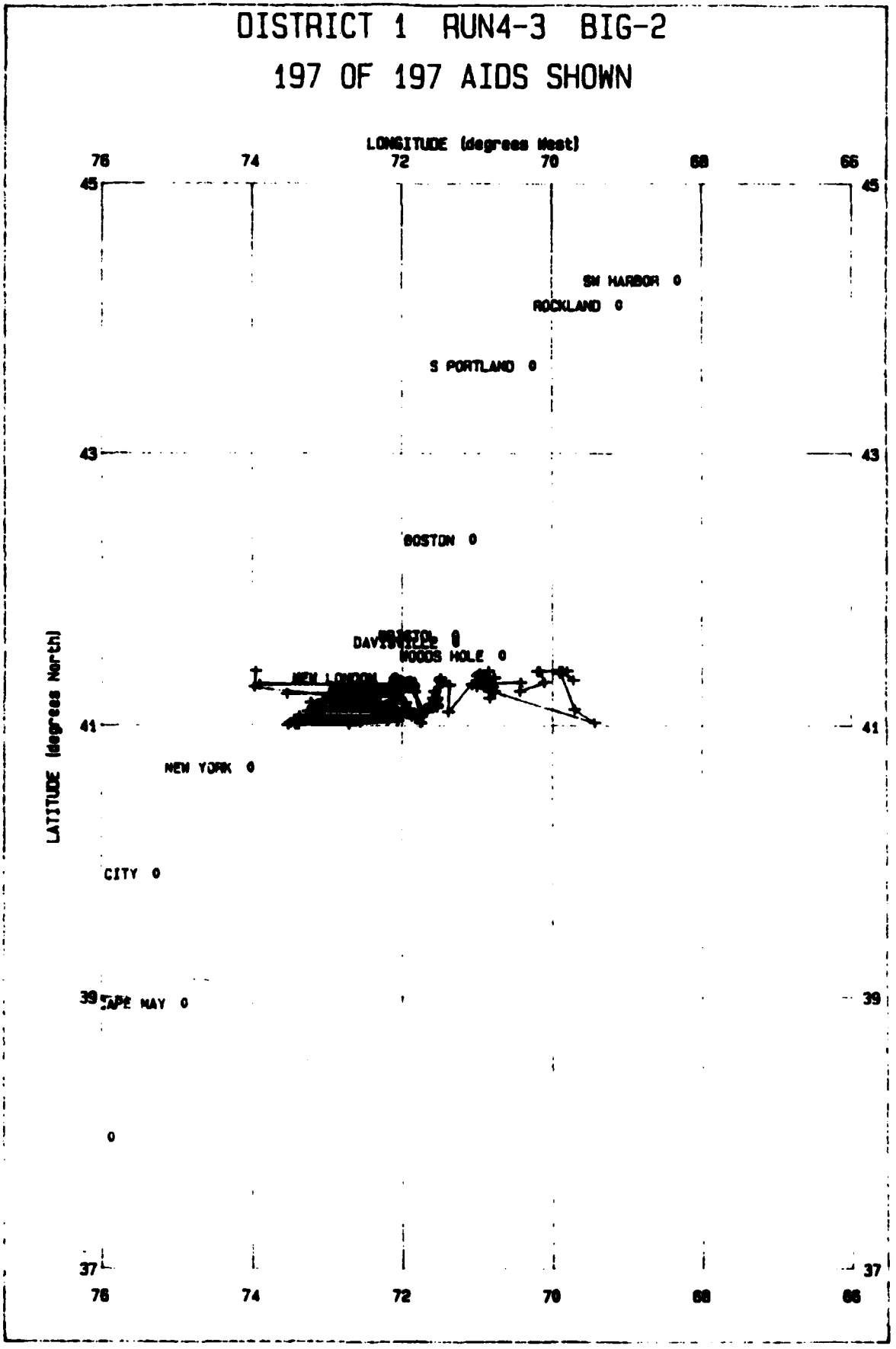

DISTRICT 1 RUN3-3 BIG-3
348 OF 348 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
ROCKLAND
S PORTLAND
BOSTON 0
NEW LONDON 0
WOODS HOLE 0
NEW YORK 0
CITY 0
CAPE MAY 0

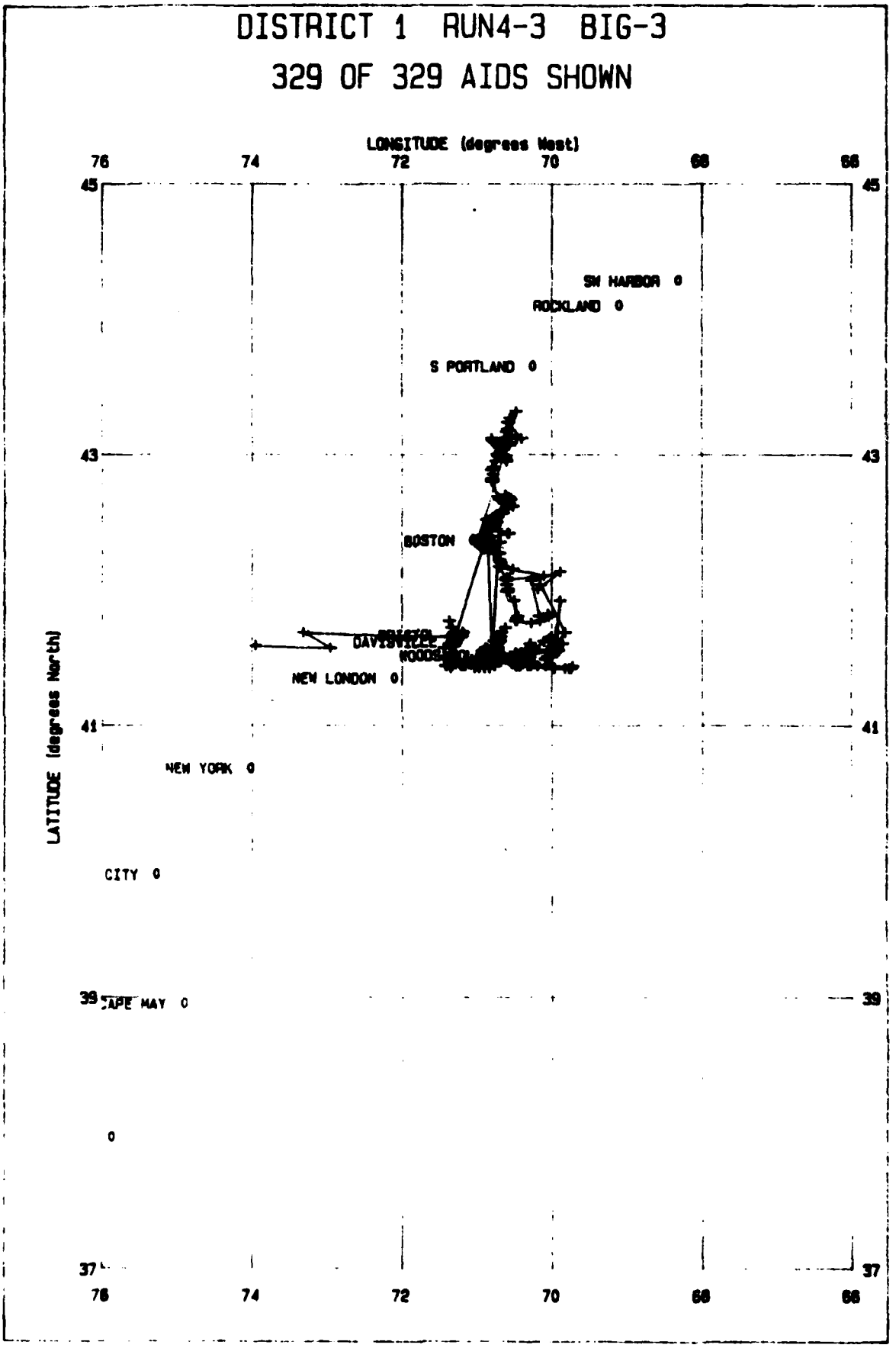

DISTRICT 1 RUN3-3 SMALL-1
204 OF 204 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
SW HARBOR 0
ROCKLAND 0
S PORTLAND 0
BOSTON 0
WOODS HOLE 0
NEW LONDON 0
CITY 0
CAPE MAY 0
0

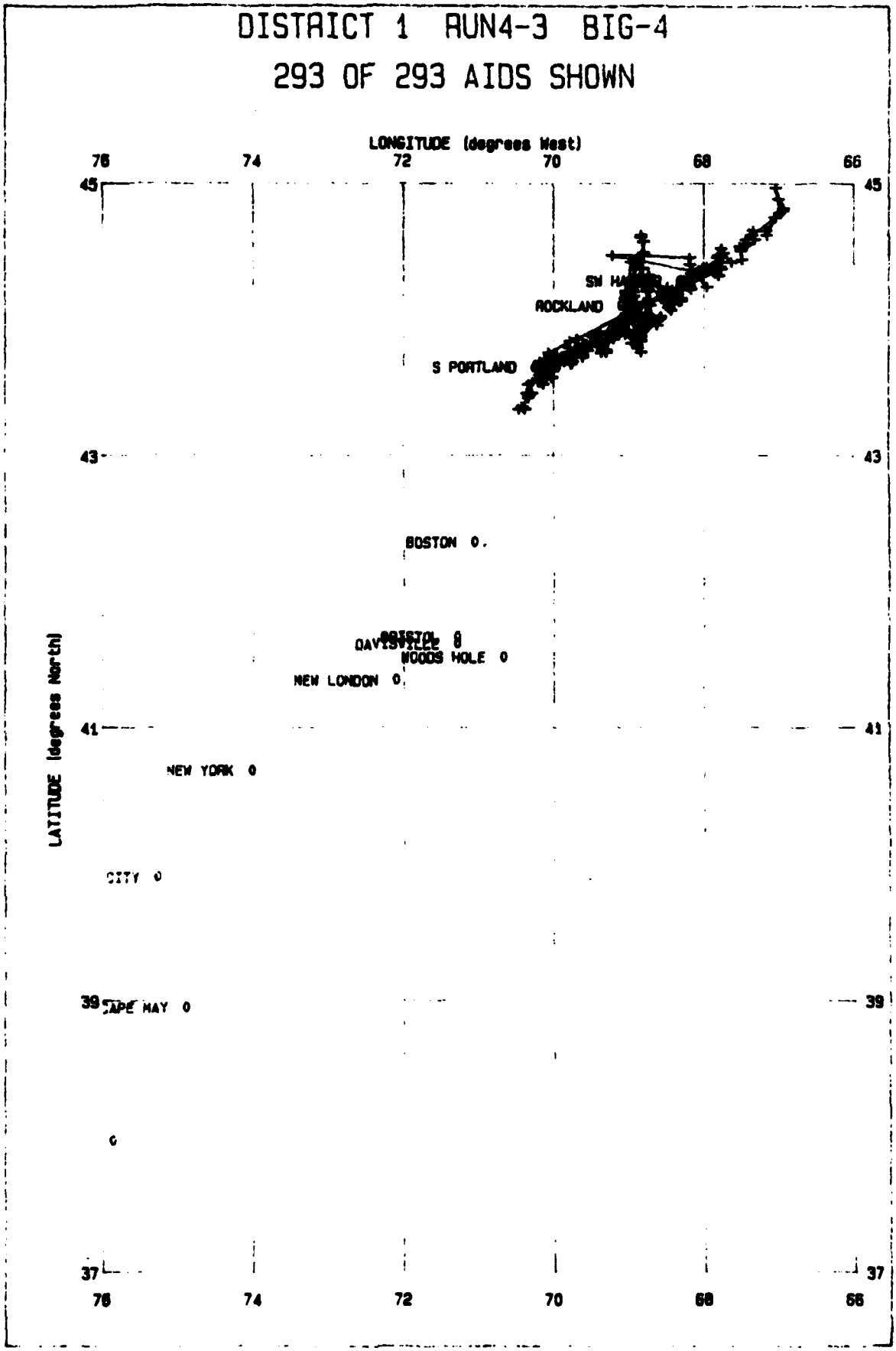

DISTRICT 1 RUN3-3 SMALL-2
381 OF 381 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
SW HARBOR
ROCKLAND
S PORTLAND
BOSTON
NEW YORK
CITY
CAPE MAY

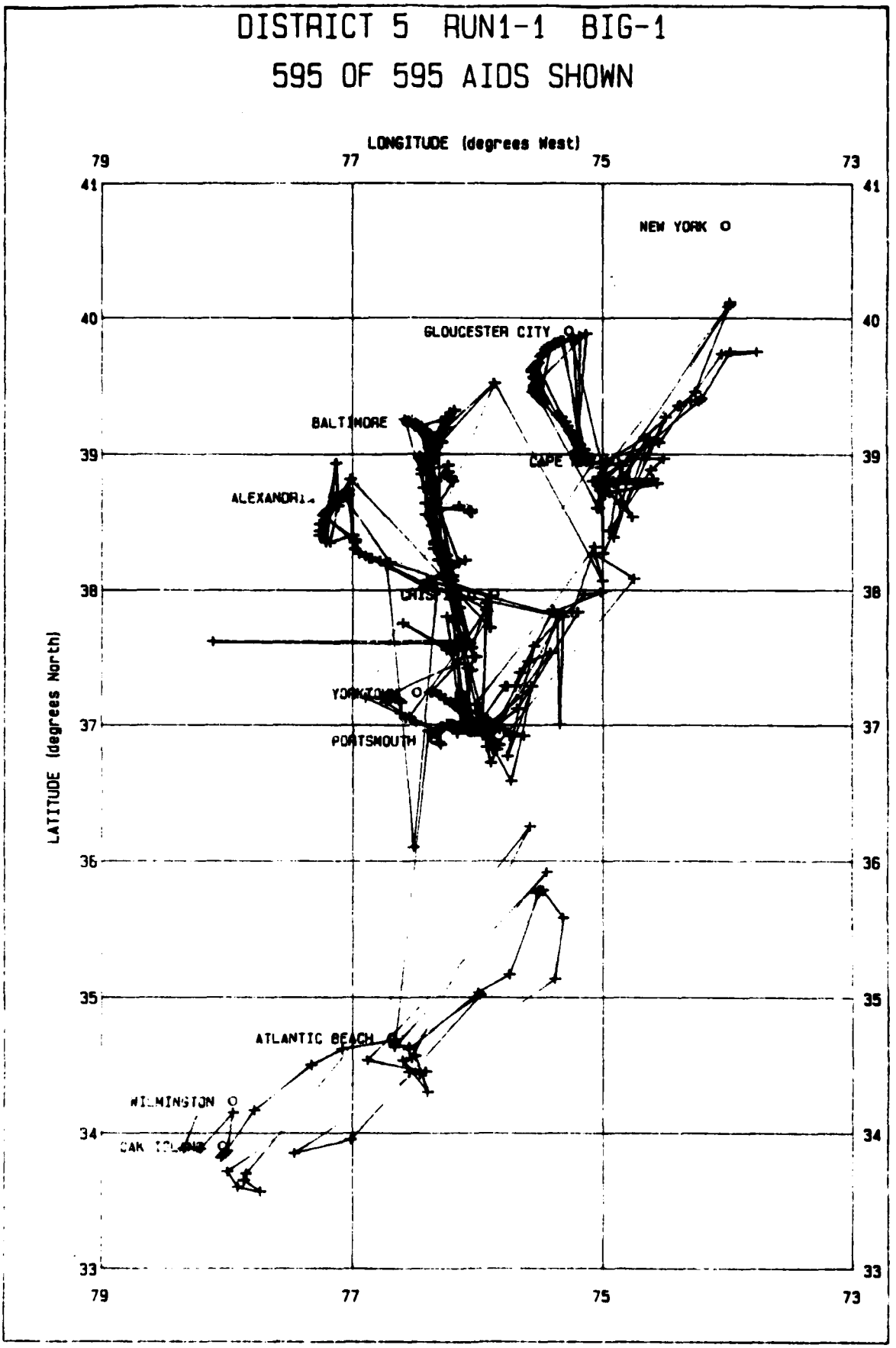

DISTRICT 1 RUN3-3 SMALL-3
301 OF 309 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
ROCKLAND
S PORTLAND
BOSTON
NEW LONDON
NEW YORK
CITY
CAPE MAY

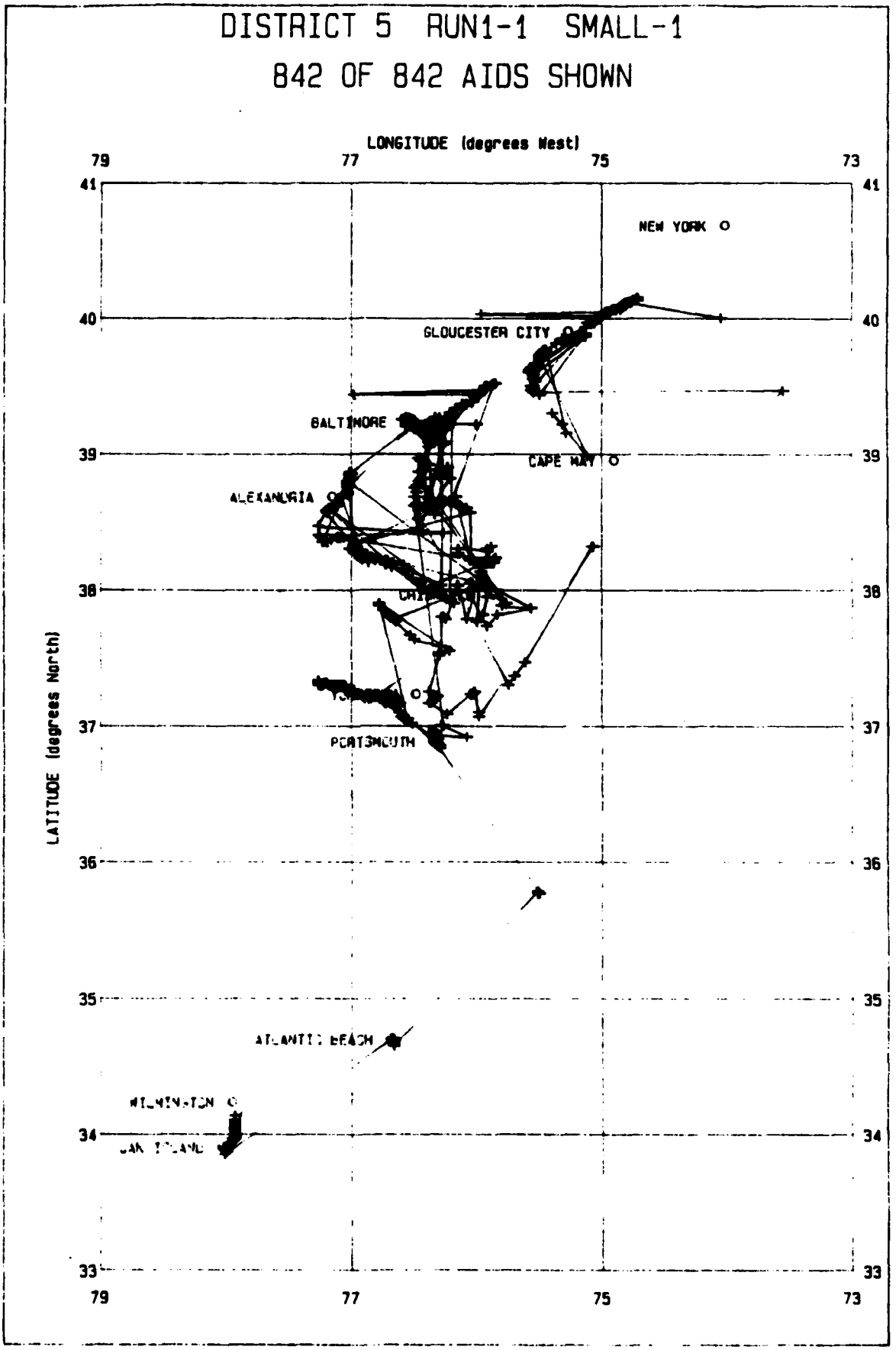

DISTRICT 1 RUN4-3 BIG-1
249 OF 249 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
SW HARBOR 0
ROCKLAND 0
S PORTLAND 0
BOSTON 0
WOODS HOLE 0
NEW LONDON 0
NEW YORK
CITY 0
CAPE MAY 0

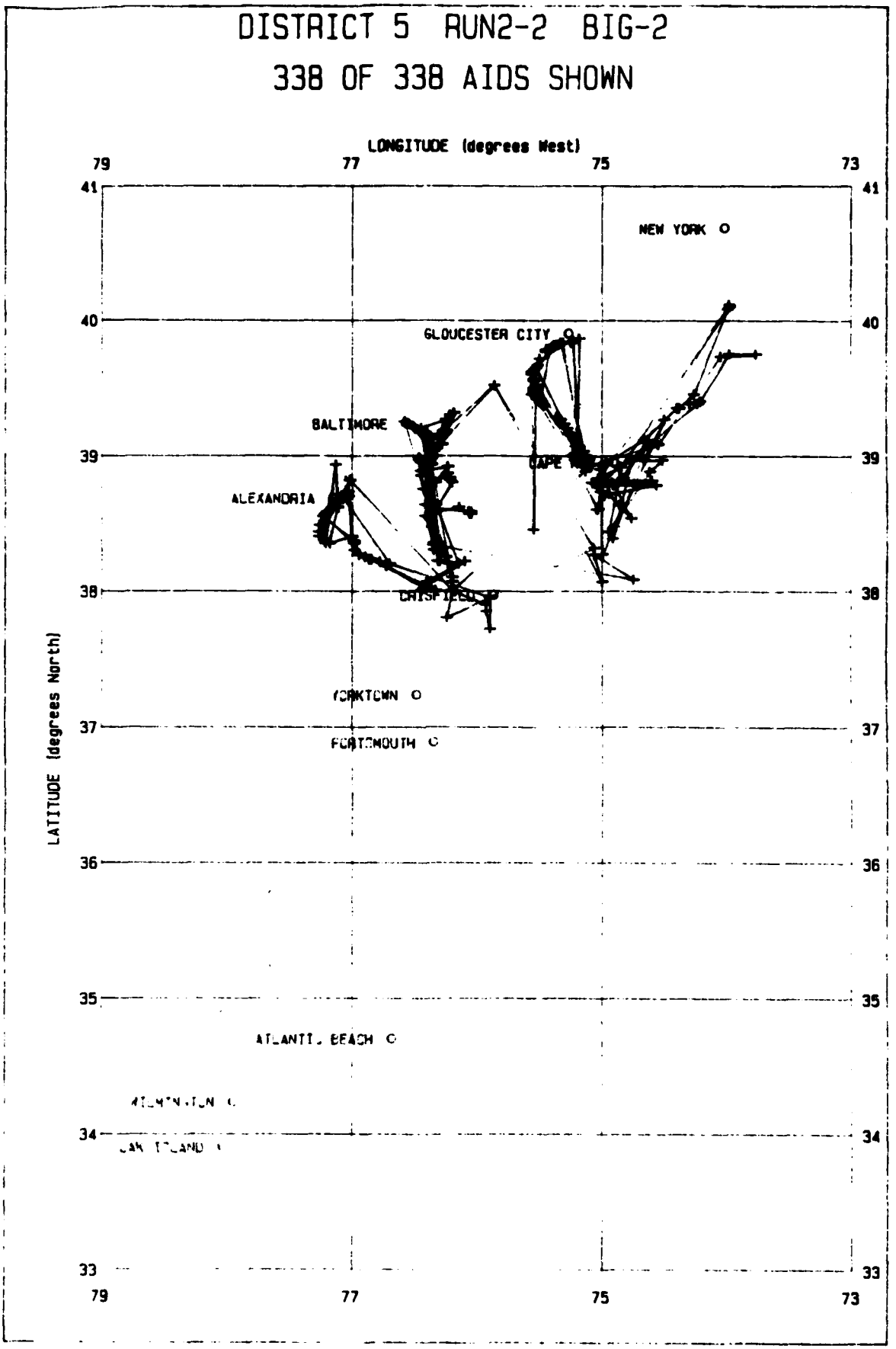

DISTRICT 1 RUN4-3 BIG-2
197 OF 197 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
SW HARBOR 0
ROCKLAND 0
S PORTLAND 0
BOSTON 0
WOODS HOLE 0
NEW YORK 0
CITY 0
CAPE MAY 0
0

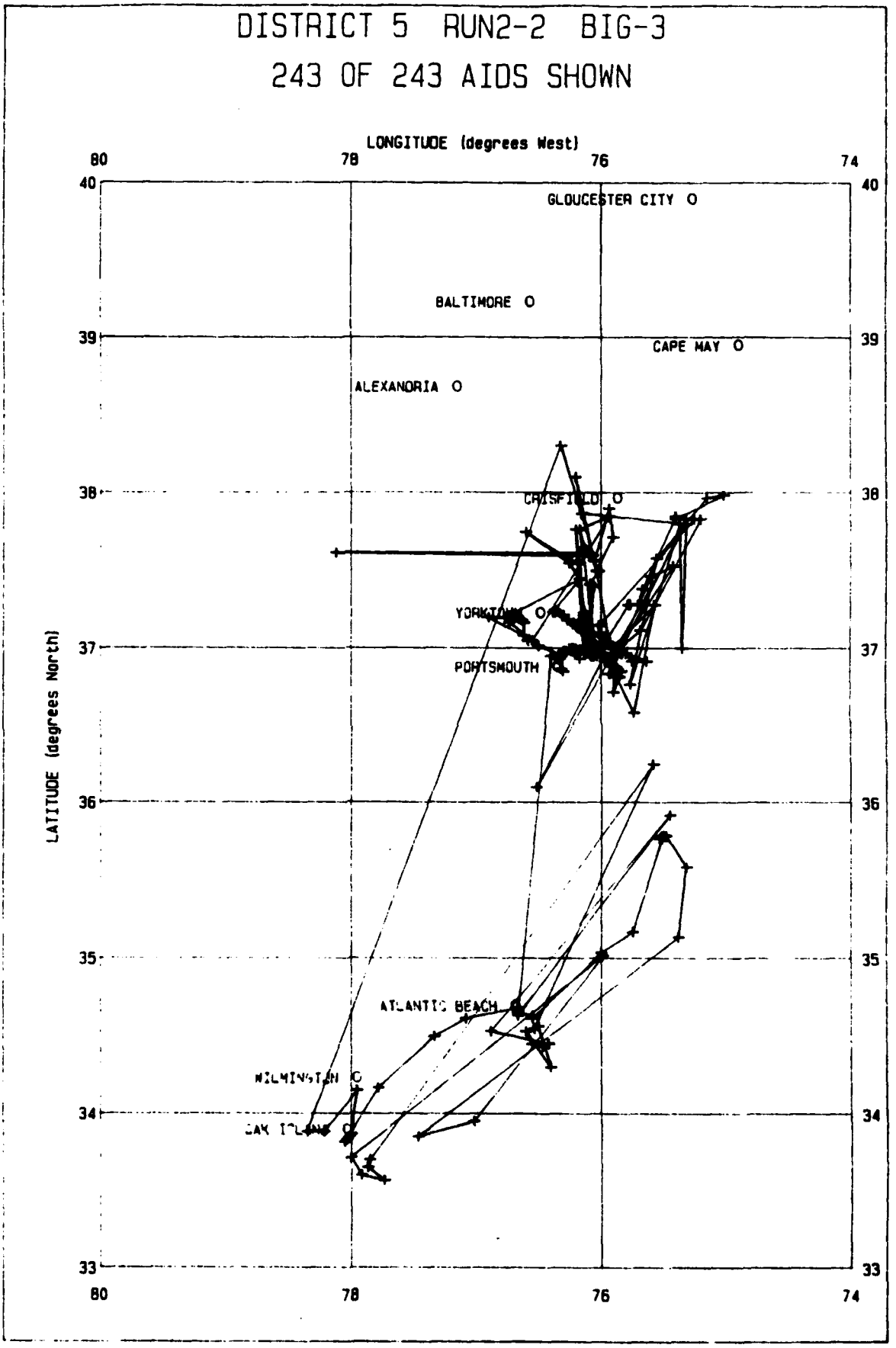

DISTRICT 1 RUN4-3 BIG-3
329 OF 329 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
SW HARBOR
ROCKLAND
S PORTLAND
BOSTON
NEW LONDON
NEW YORK
CITY
CAPE MAY

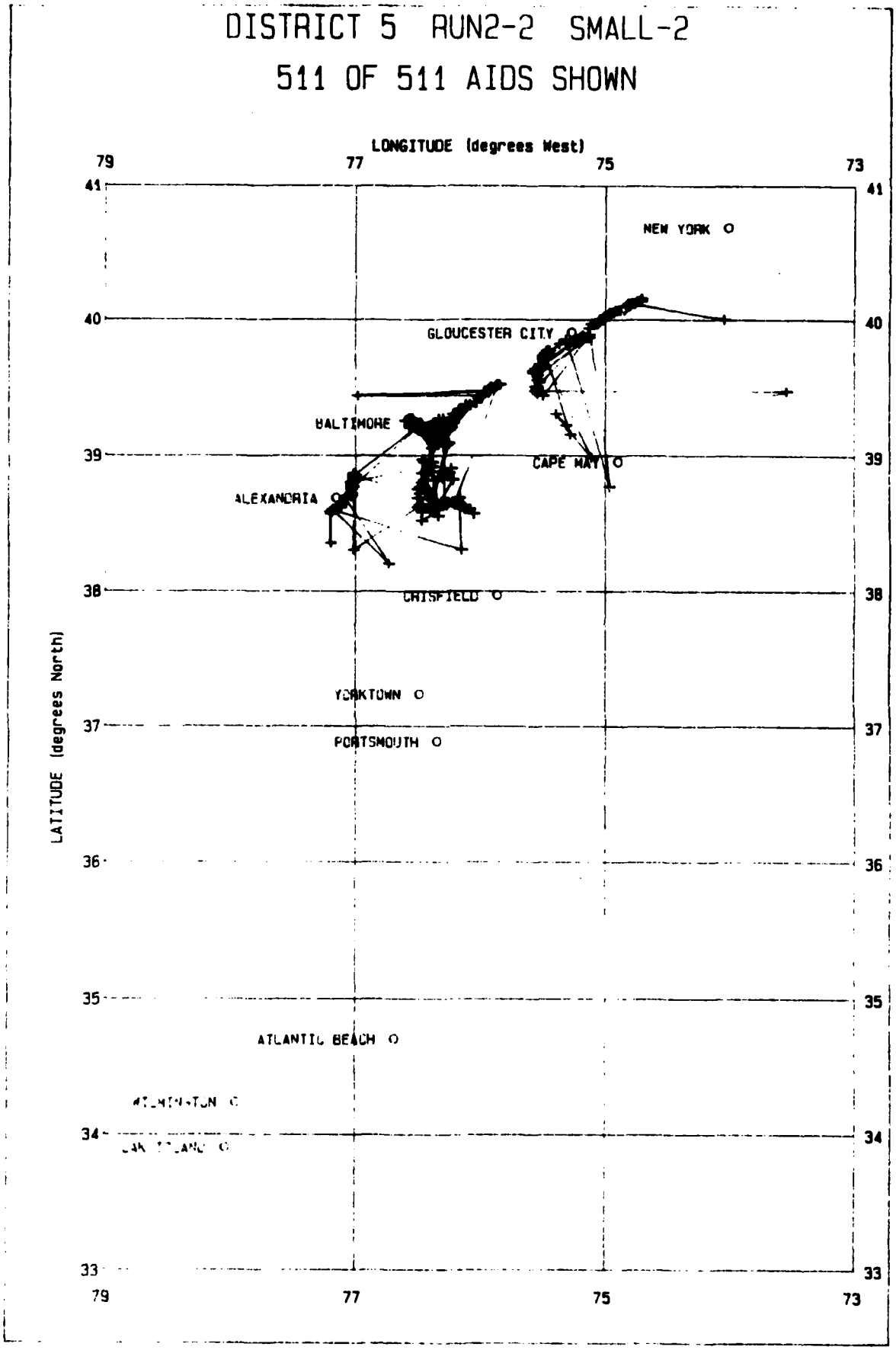

DISTRICT 1 RUN4-3 BIG-4
293 OF 293 AIDS SHOWN
LONGITUDE (degrees West)
76
74
72
70
68
66
45
43
41
39
37
LATITUDE (degrees North)
ROCKLAND
S PORTLAND
BOSTON 0.
NEW LONDON 0
NEW YORK 0
CITY 0
CAPE MAY 0

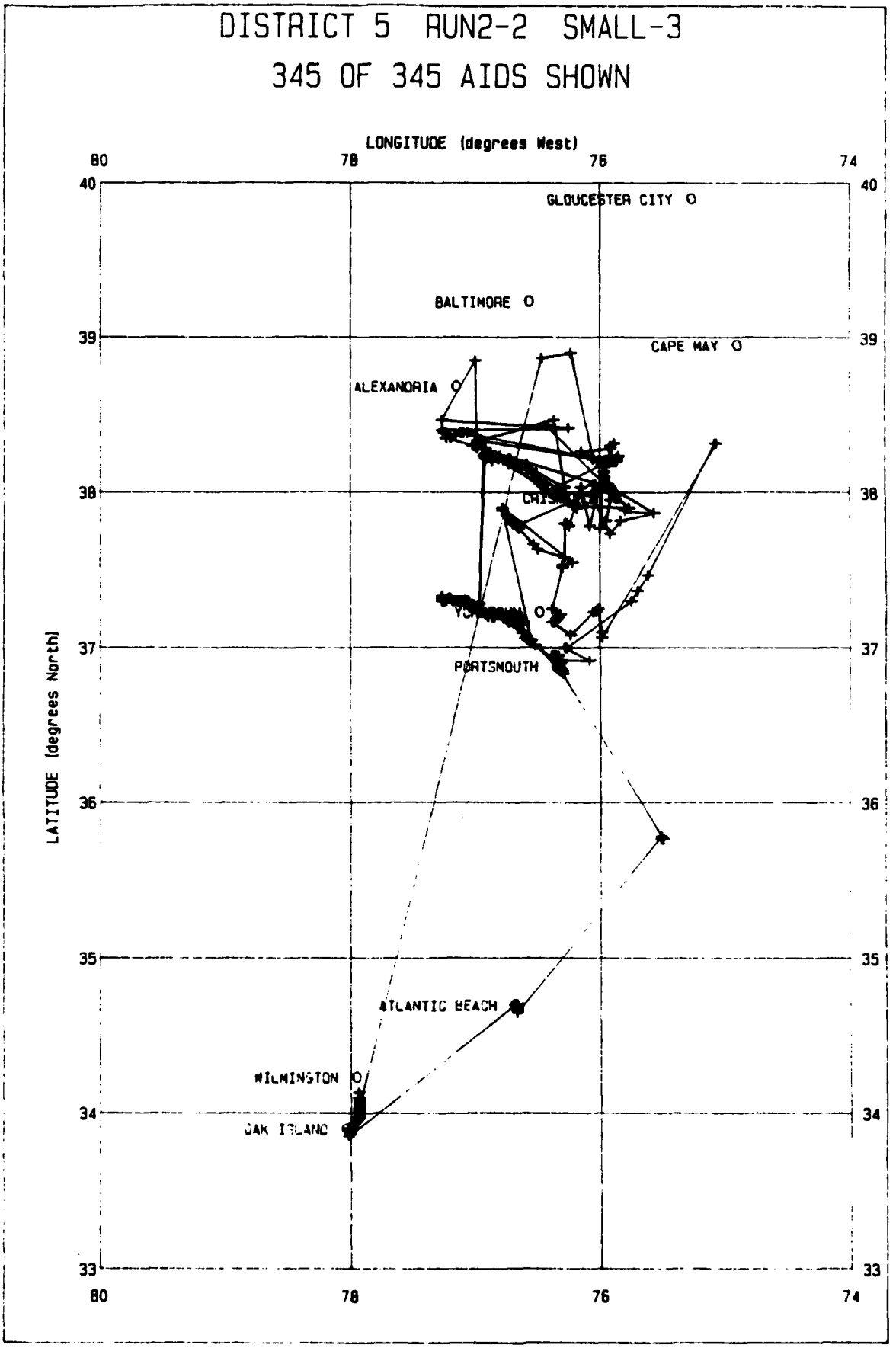

DISTRICT 5 RUN1-1 BIG-1
595 OF 595 AIDS SHOWN
LONGITUDE (degrees West)
79
77
75
73
41
40
39
38
37
36
35
34
33
LATITUDE (degrees North)
NEW YORK
GLOUCESTER CITY
BALTIMORE
CAPE
ALEXANDRIA
YORKTOWN
PORTSMOUTH
ATLANTIC BEACH
WILMINGTON

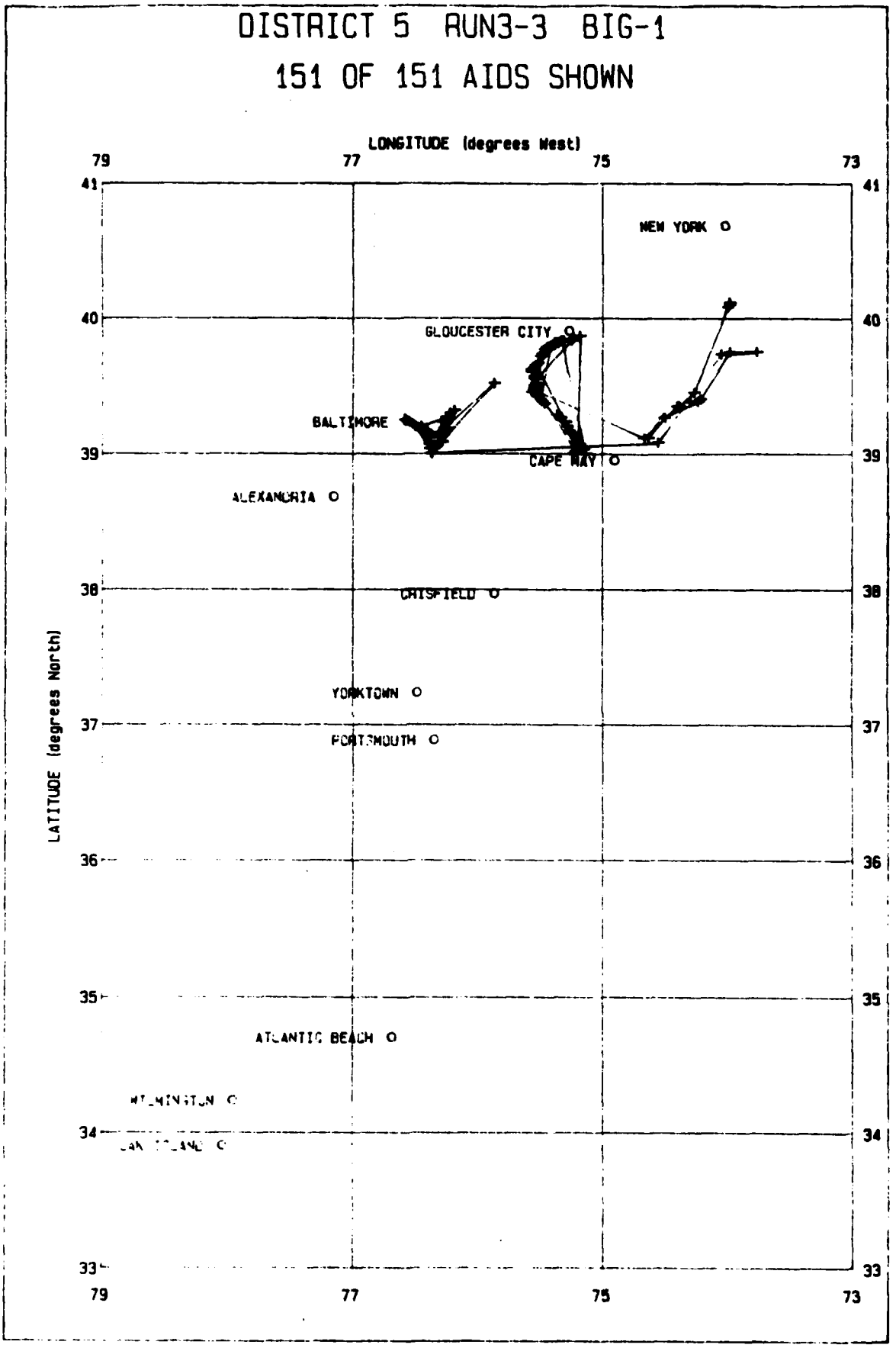

DISTRICT 5 RUN1-1 SMALL-1
842 OF 842 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
79
77
75
73
41
40
39
38
37
36
35
34
33
NEW YORK
GLOUCESTER CITY
BALTIMORE
CAPE MAY
ALEXANDRIA
PORTSMOUTH
ATLANTIC BEACH

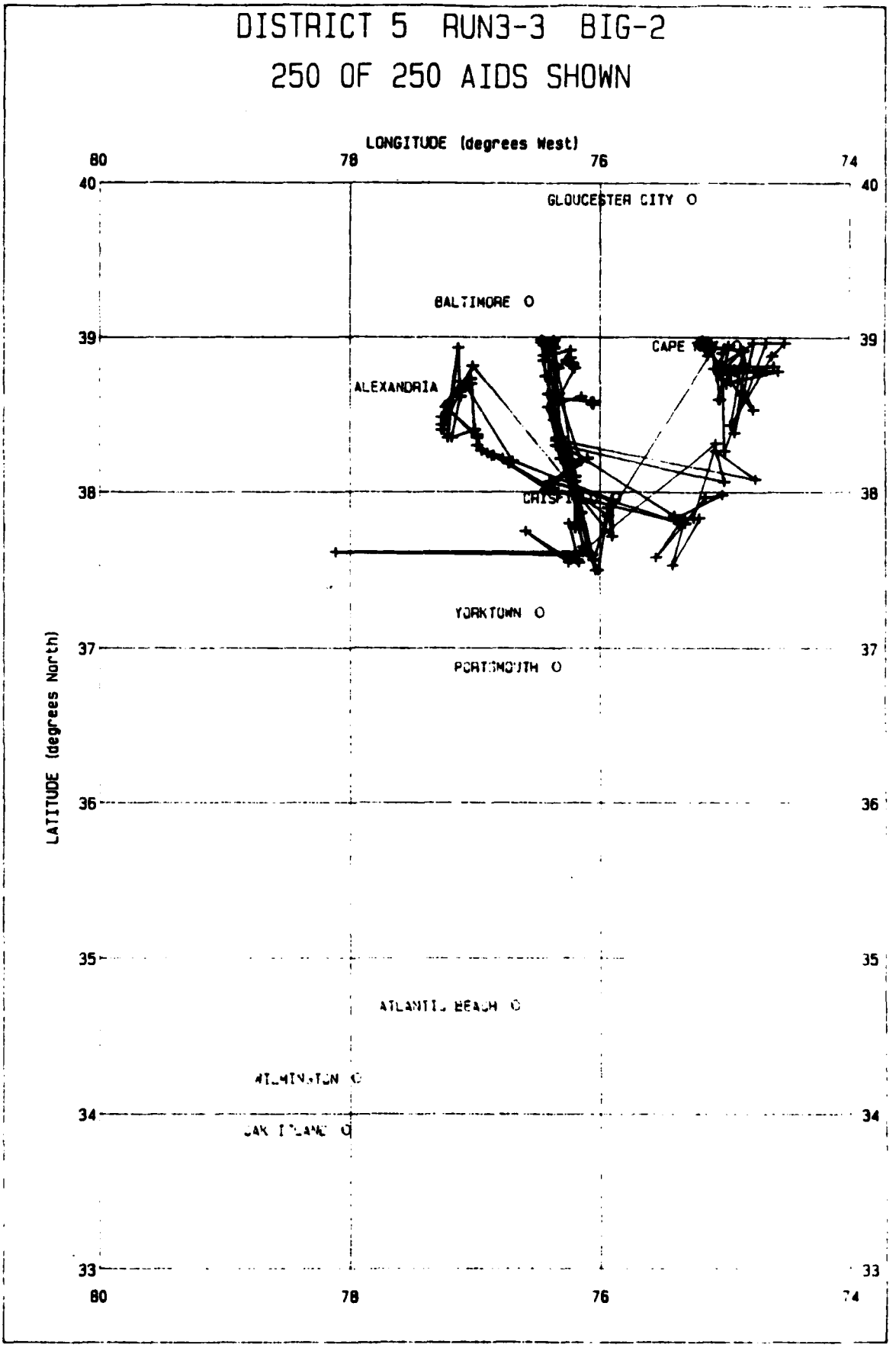

DISTRICT 5 RUN2-2 BIG-2
338 OF 338 AIDS SHOWN
LONGITUDE (degrees West)
79
77
75
73
41
40
39
38
37
36
35
34
33
LATITUDE (degrees North)
NEW YORK
GLOUCESTER CITY
BALTIMORE
CAPE
ALEXANDRIA
YORKTOWN
PORTSMOUTH
ATLANTIC BEACH

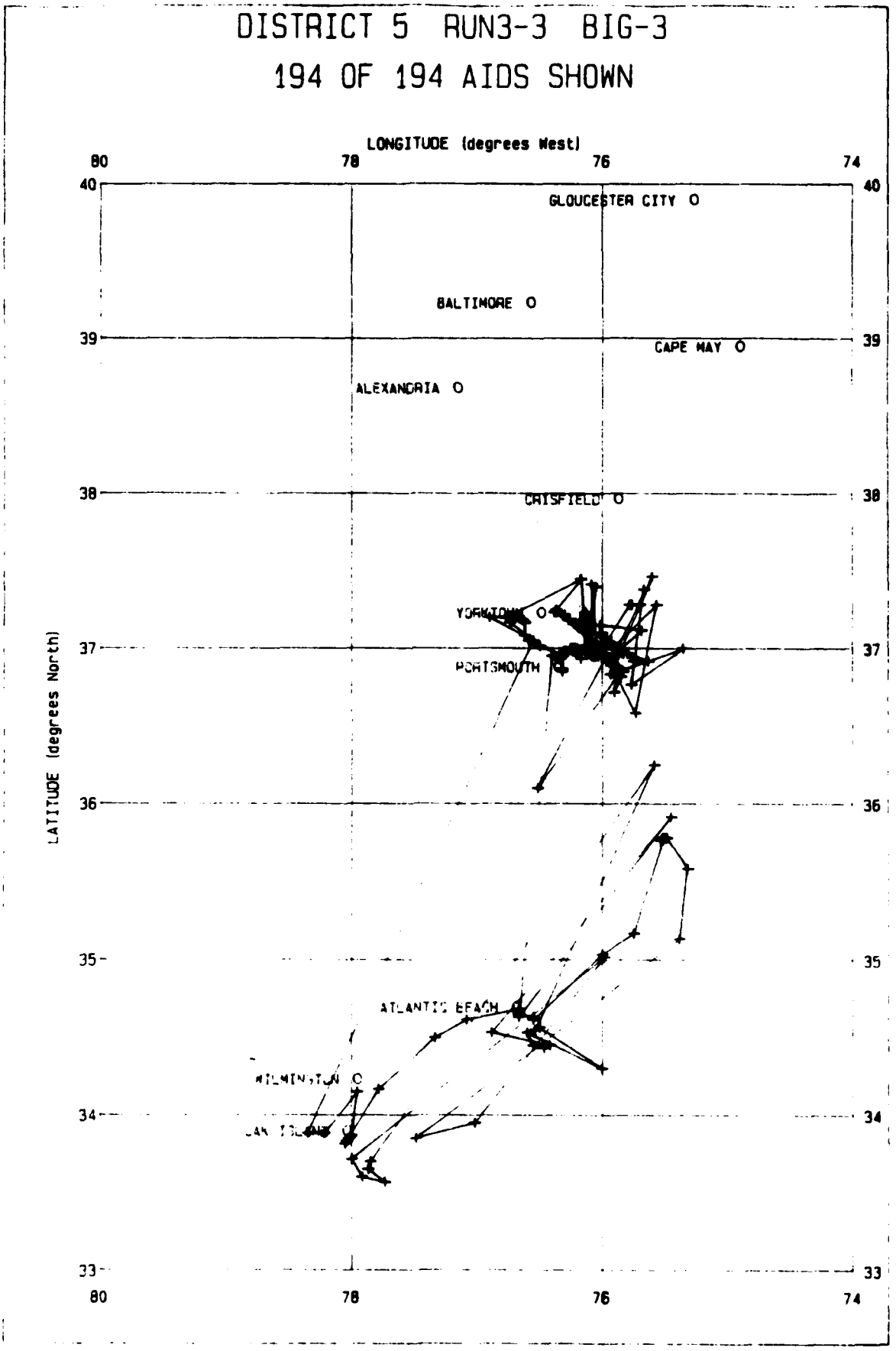

DISTRICT 5 RUN2-2 BIG-3
243 OF 243 AIDS SHOWN
LONGITUDE (degrees West)
80
78
76
74
40
39
38
37
36
35
34
33
LATITUDE (degrees North)
GLOUCESTER CITY
BALTIMORE
CAPE MAY
ALEXANORIA
CRISFIELD
YORKTOWN
PORTSMOUTH
ATLANTIC BEACH
WILMINGTON

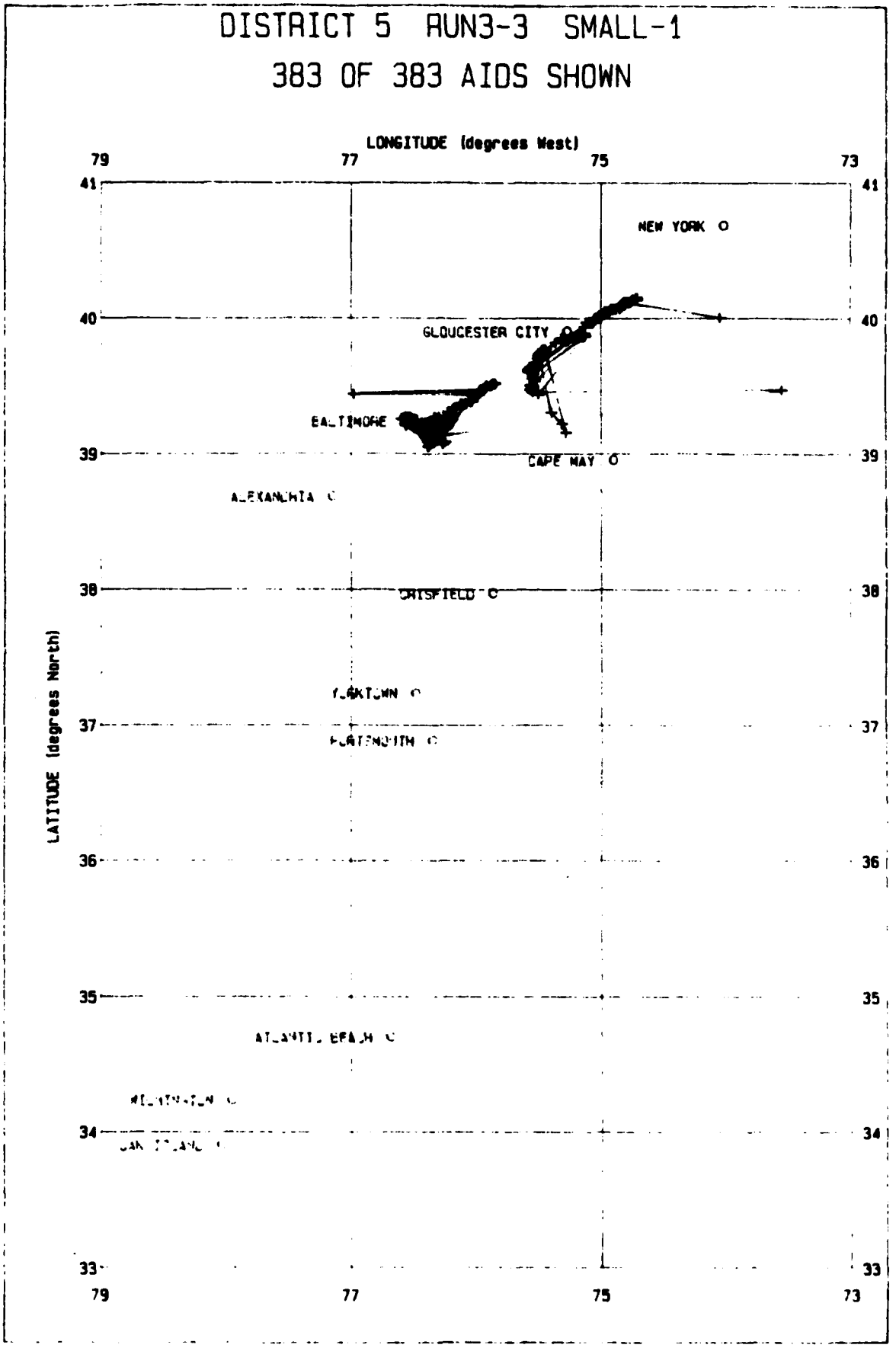

DISTRICT 5 RUN2-2 SMALL-2
511 OF 511 AIDS SHOWN
LONGITUDE (degrees West)
79
77
75
73
41
40
39
38
37
36
35
34
33
LATITUDE (degrees North)
NEW YORK
GLOUCESTER CITY
BALTIMORE
CAPE MAY
ALEXANDRIA
CRISFIELD
YORKTOWN
PORTSMOUTH
ATLANTIC BEACH

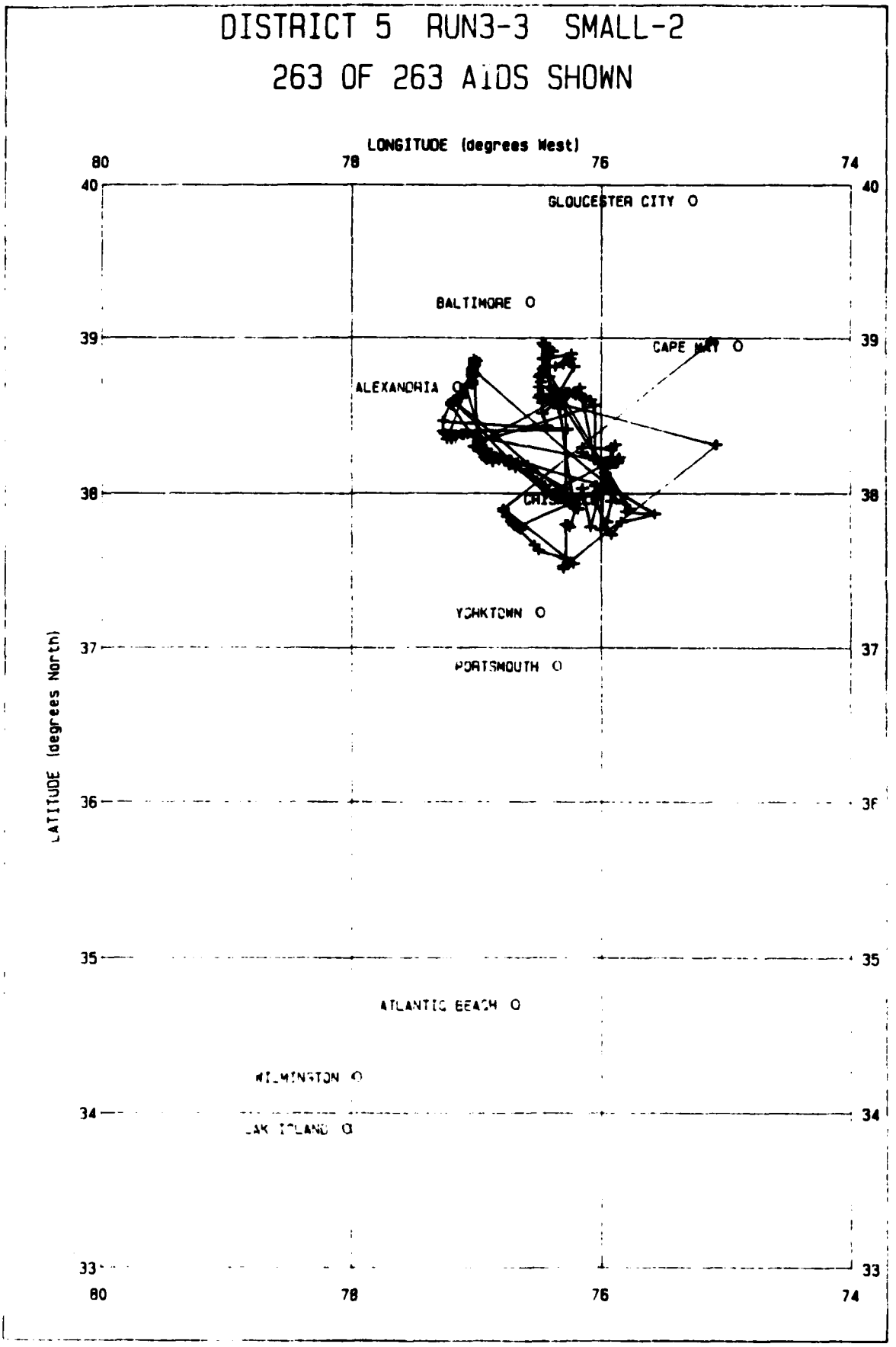

DISTRICT 5 RUN2-2 SMALL-3
345 OF 345 AIDS SHOWN
LONGITUDE (degrees West)
80
78
76
74
40
39
38
37
36
35
34
33
LATITUDE (degrees North)
GLOUCESTER CITY
BALTIMORE
CAPE MAY
ALEXANDRIA
PORTSMOUTH
ATLANTIC BEACH
WILMINGTON
OAK ISLAND

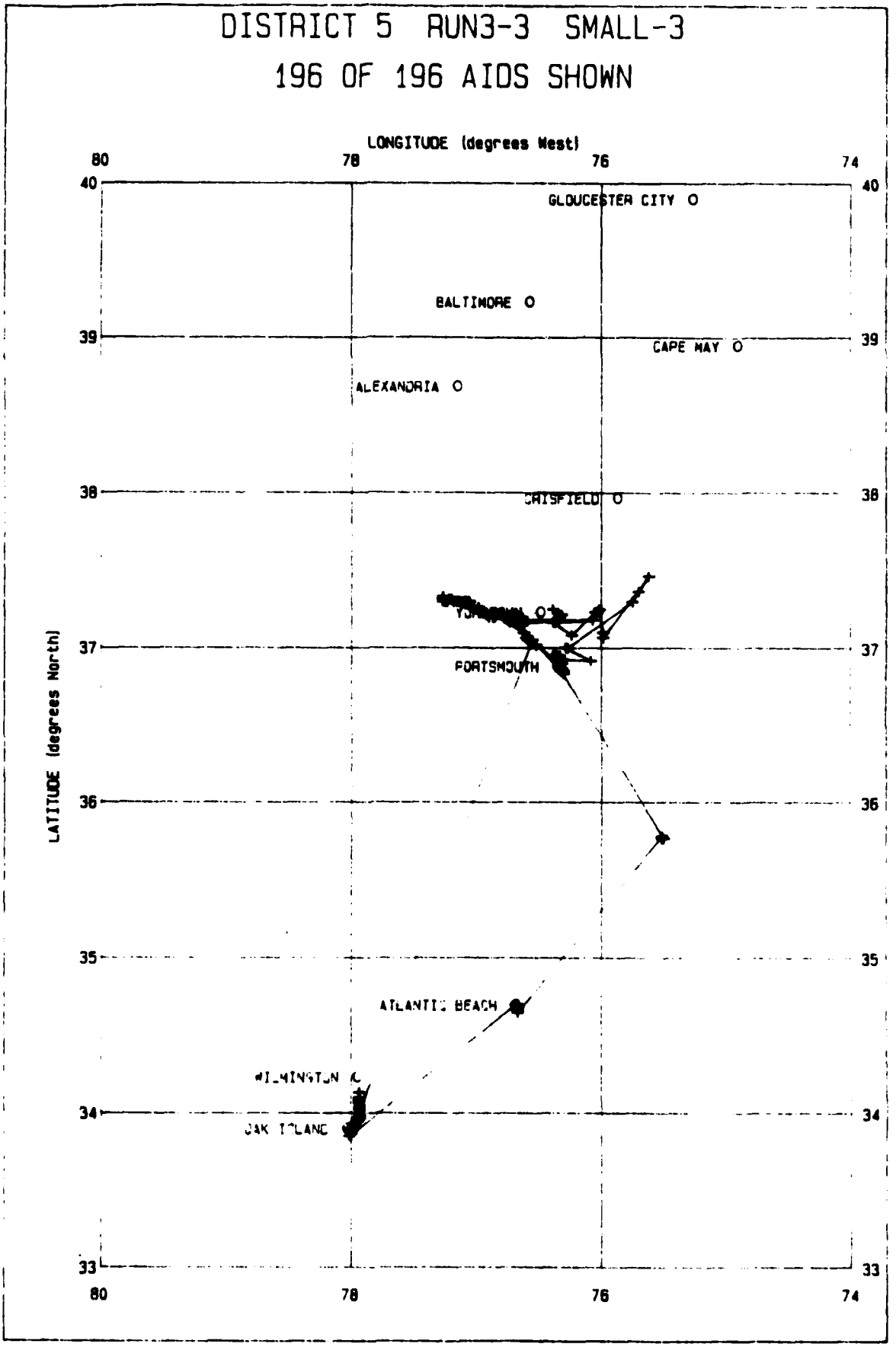

DISTRICT 5 RUN3-3 BIG-1
151 OF 151 AIDS SHOWN
LONGITUDE (degrees West)
79
77
75
73
41
40
39
38
37
36
35
34
33
LATITUDE (degrees North)
NEW YORK
GLOUCESTER CITY
BALTIMORE
CAPE MAY
ALEXANDRIA
CRISFIELD
YORKTOWN
PORTSMOUTH
ATLANTIC BEACH

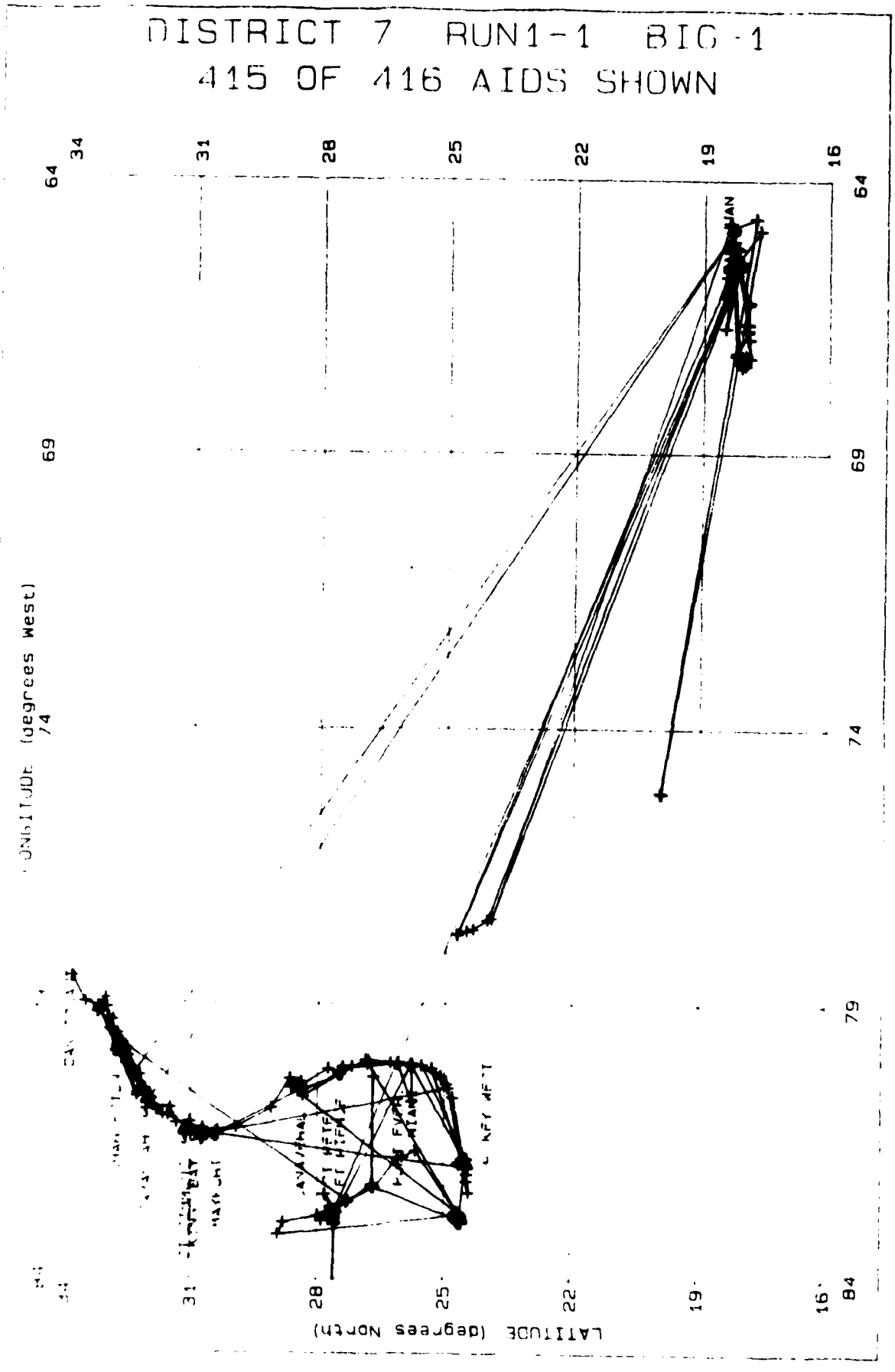

DISTRICT 5 RUN3-3 BIG-2
250 OF 250 AIDS SHOWN
LONGITUDE (degrees West)
80
78
76
74
40
39
38
37
36
35
34
33
LATITUDE (degrees North)
GLOUCESTER CITY
BALTIMORE
ALEXANDRIA
CAPE
YORKTOWN
PORTSMOUTH
ATLANTIC BEACH

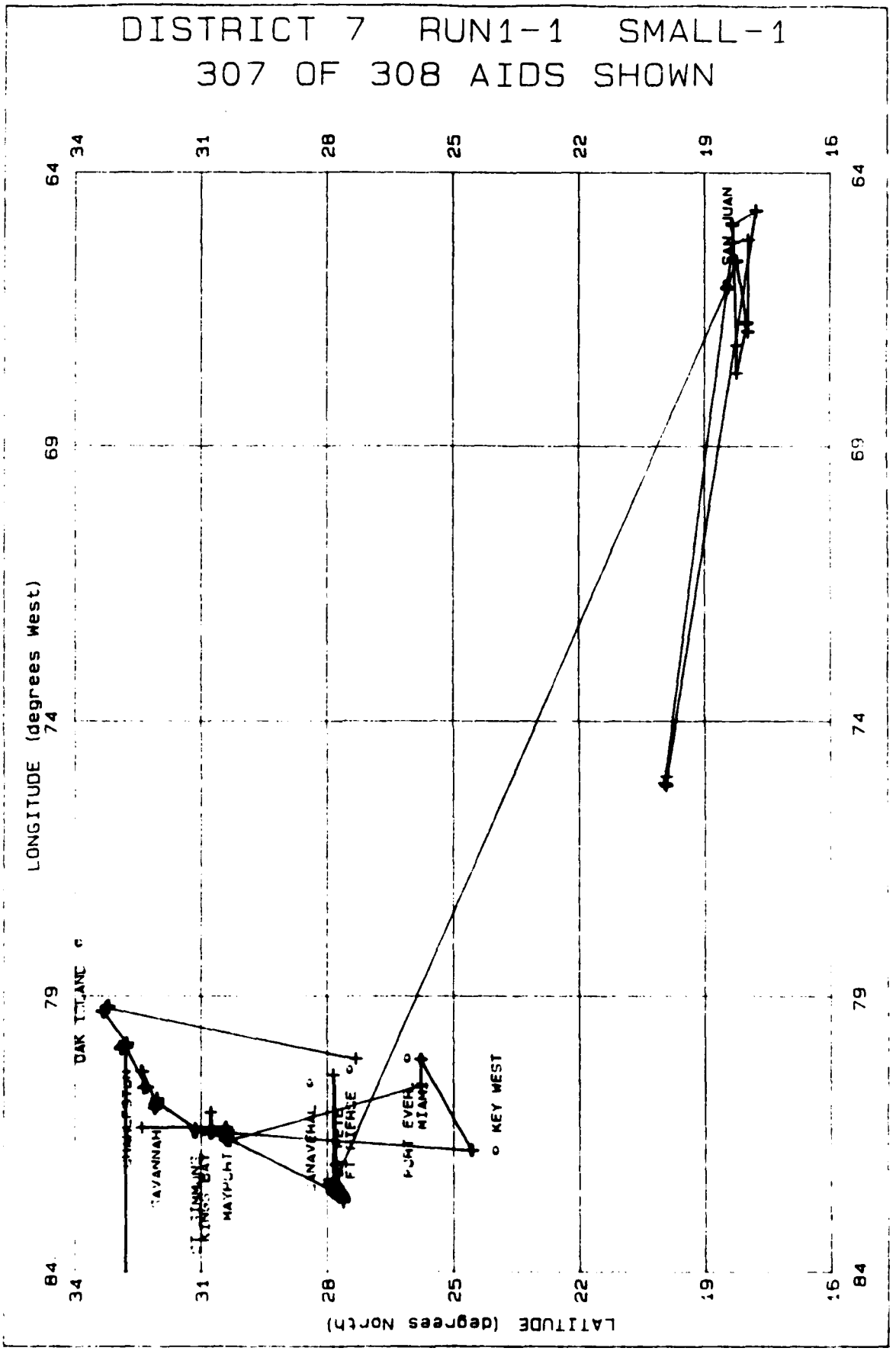

DISTRICT 5 RUN3-3 BIG-3
194 OF 194 AIDS SHOWN
LONGITUDE (degrees West)
80
78
76
74
40
39
38
37
36
35
34
33
LATITUDE (degrees North)
GLOUCESTER CITY
BALTIMORE
CAPE MAY
ALEXANDRIA
CRISFIELD
YORKTOWN
PORTSMOUTH
ATLANTIC BEACH
WILMINGTON

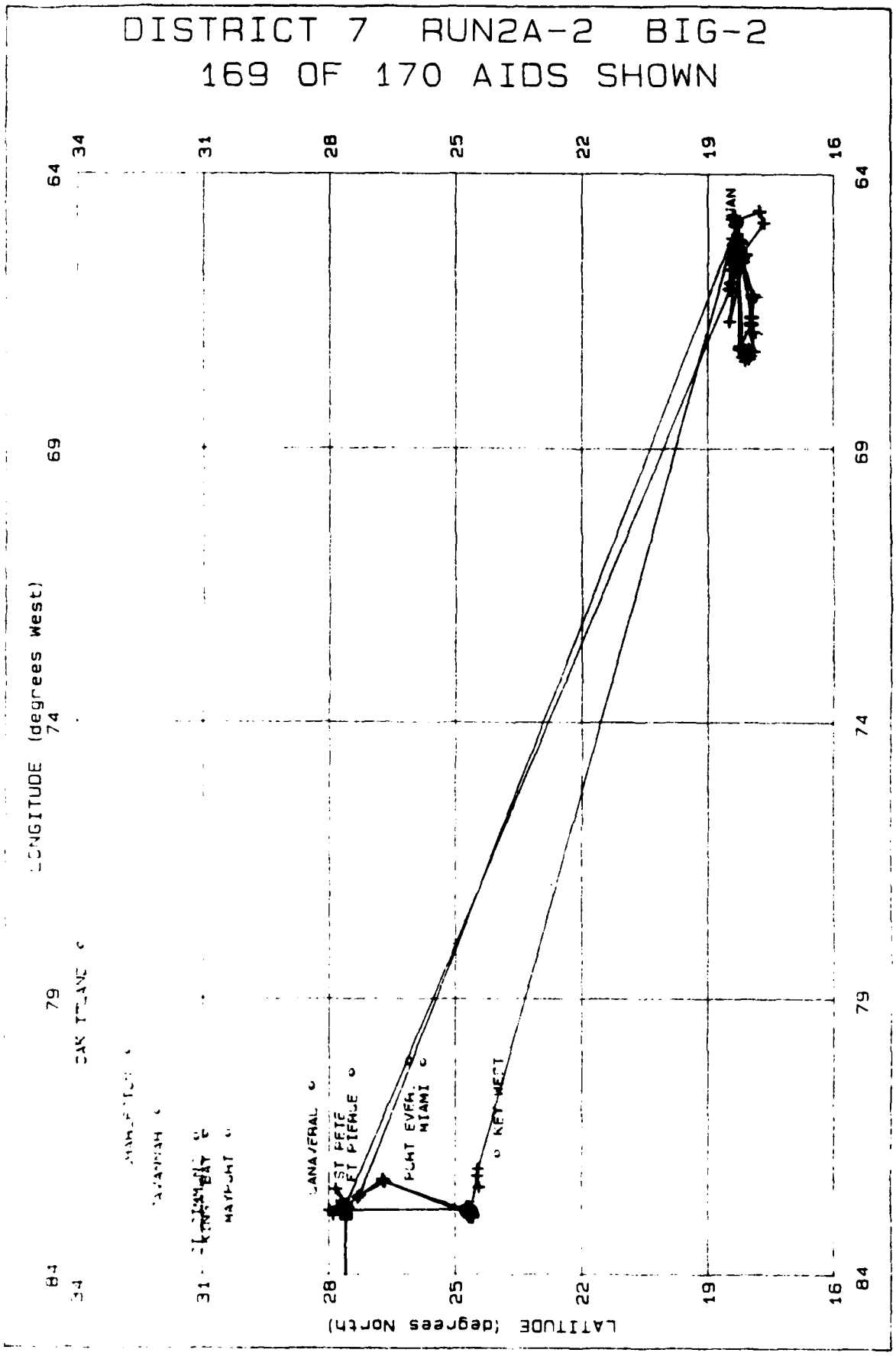

DISTRICT 5 RUN3-3 SMALL-1
383 OF 383 AIDS SHOWN
LONGITUDE (degrees West)
79
77
75
73
41
40
39
38
37
36
35
34
33
NEW YORK
GLOUCESTER CITY
BALTIMORE
CAPE MAY
CRISFIELD
LATITUDE (degrees North)

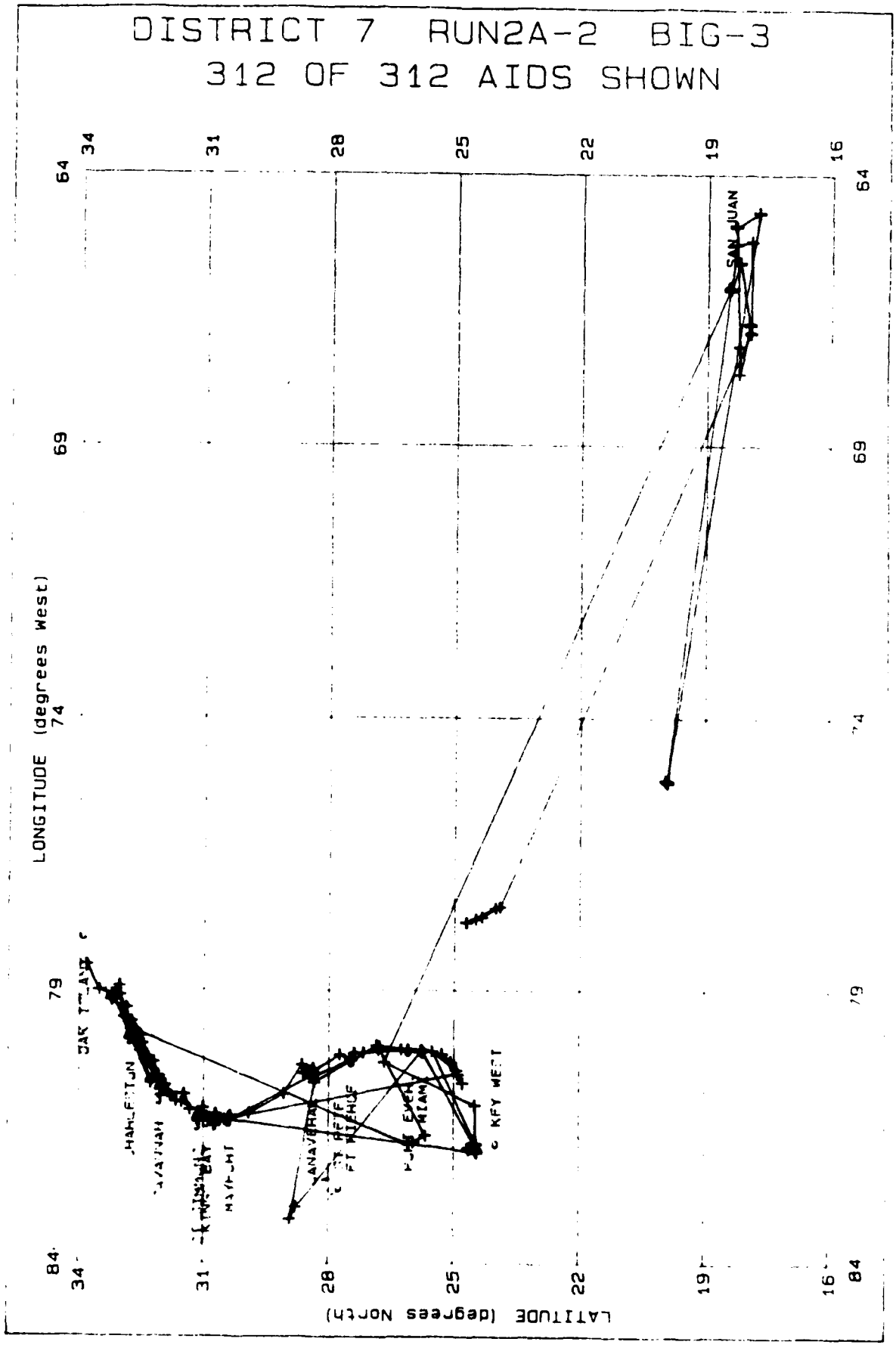

DISTRICT 5 RUN3-3 SMALL-2
263 OF 263 AIDS SHOWN
LONGITUDE (degrees West)
80
78
76
74
40
39
38
37
36
35
34
33
LATITUDE (degrees North)
GLOUCESTER CITY O
BALTIMORE O
CAPE MAY O
ALEXANDRIA O
YORKTOWN O
PORTSMOUTH O
ATLANTIC BEACH O
WILMINGTON O

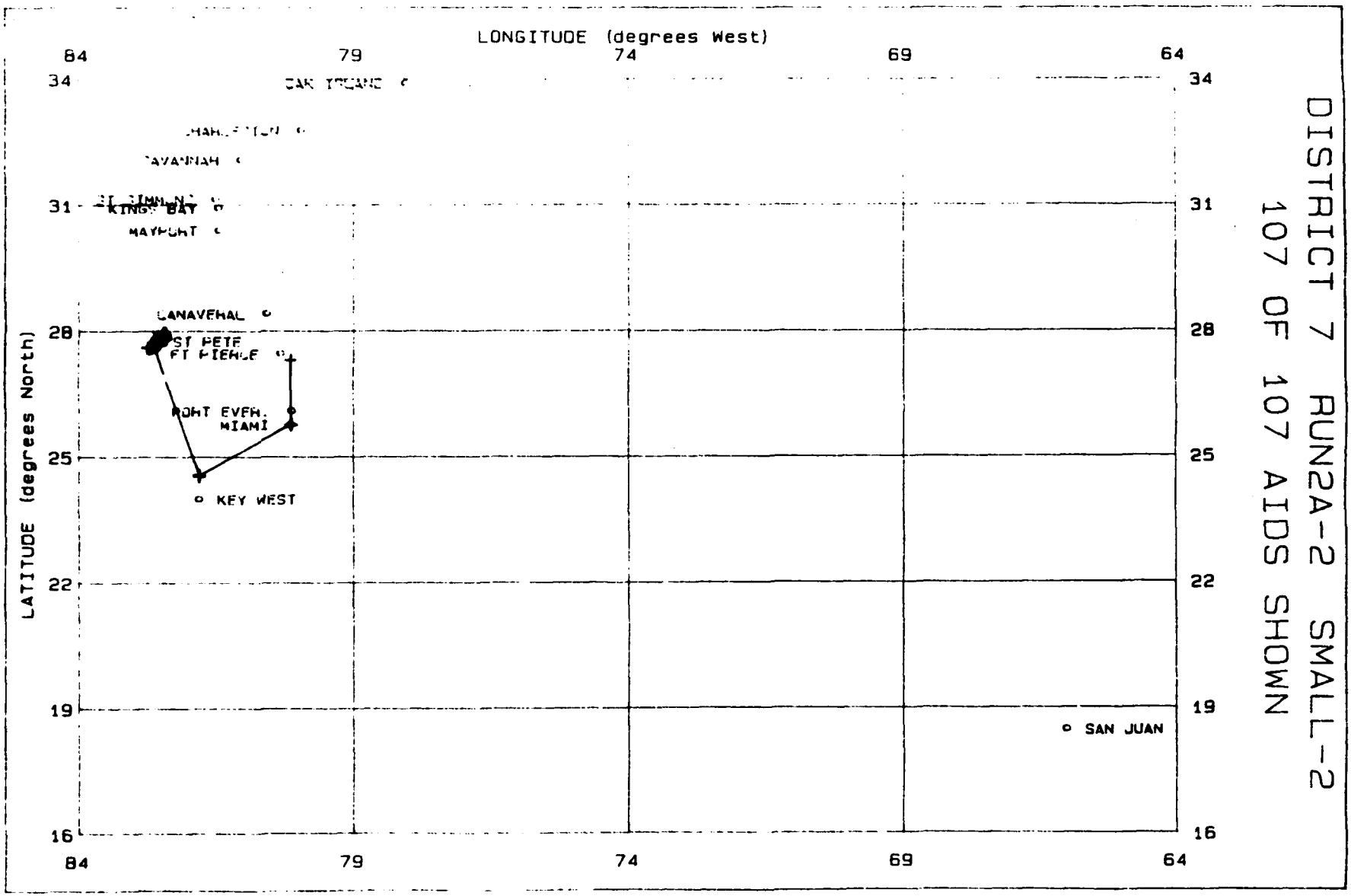

DISTRICT 5 RUN3-3 SMALL-3
196 OF 196 AIDS SHOWN
LONGITUDE (degrees West)
80
78
76
74
40
39
38
37
36
35
34
33
LATITUDE (degrees North)
GLOUCESTER CITY O
BALTIMORE O
CAPE MAY O
ALEXANDRIA O
CRISFIELD O
PORTSMOUTH
ATLANTIC BEACH

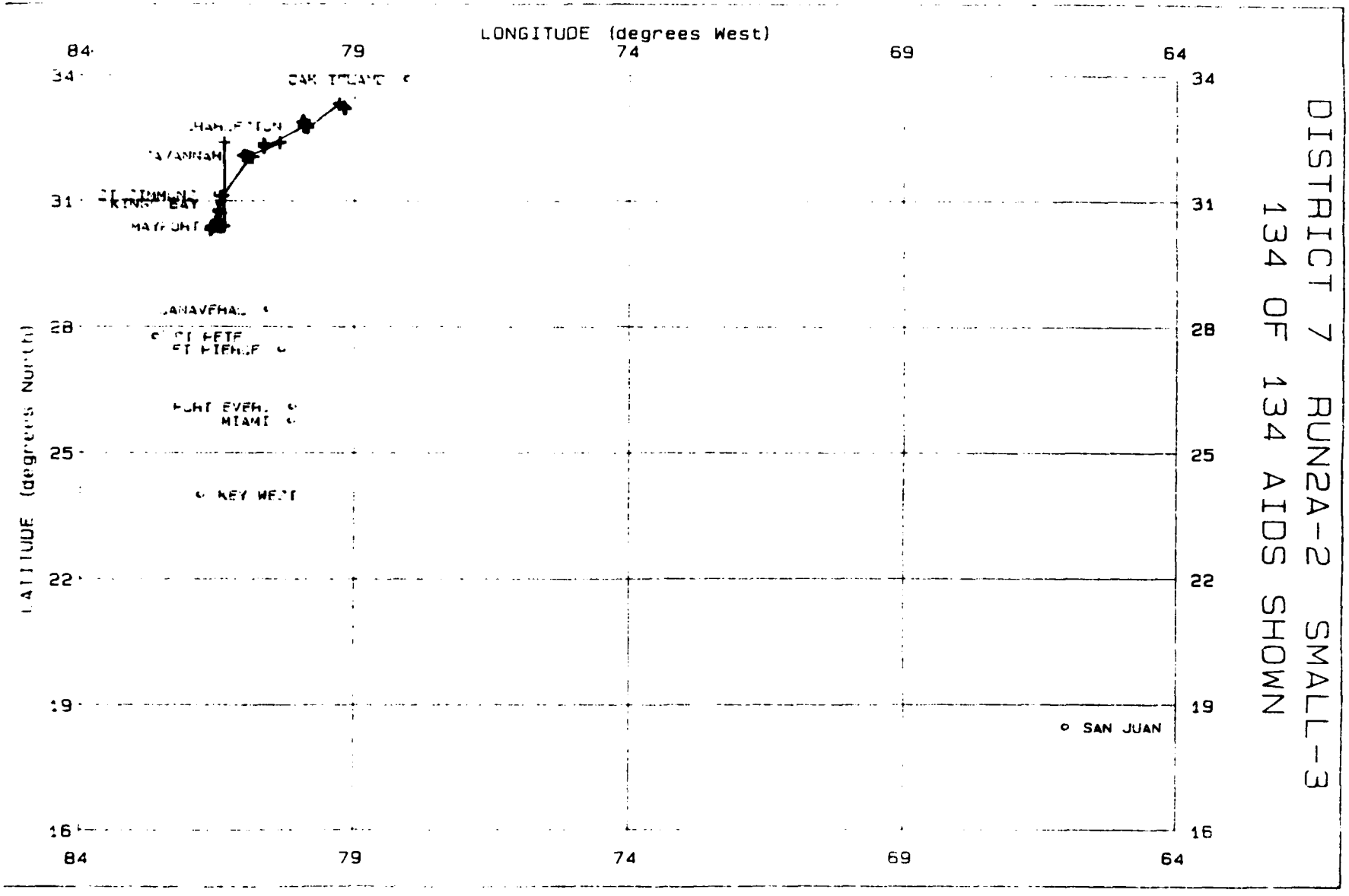

DISTRICT 7 RUN1-1 BIG-1
415 OF 416 AIDS SHOWN
34
31
28
25
22
19
16
64
69
74
79
84
LONGITUDE (degrees West)
LATITUDE (degrees North)

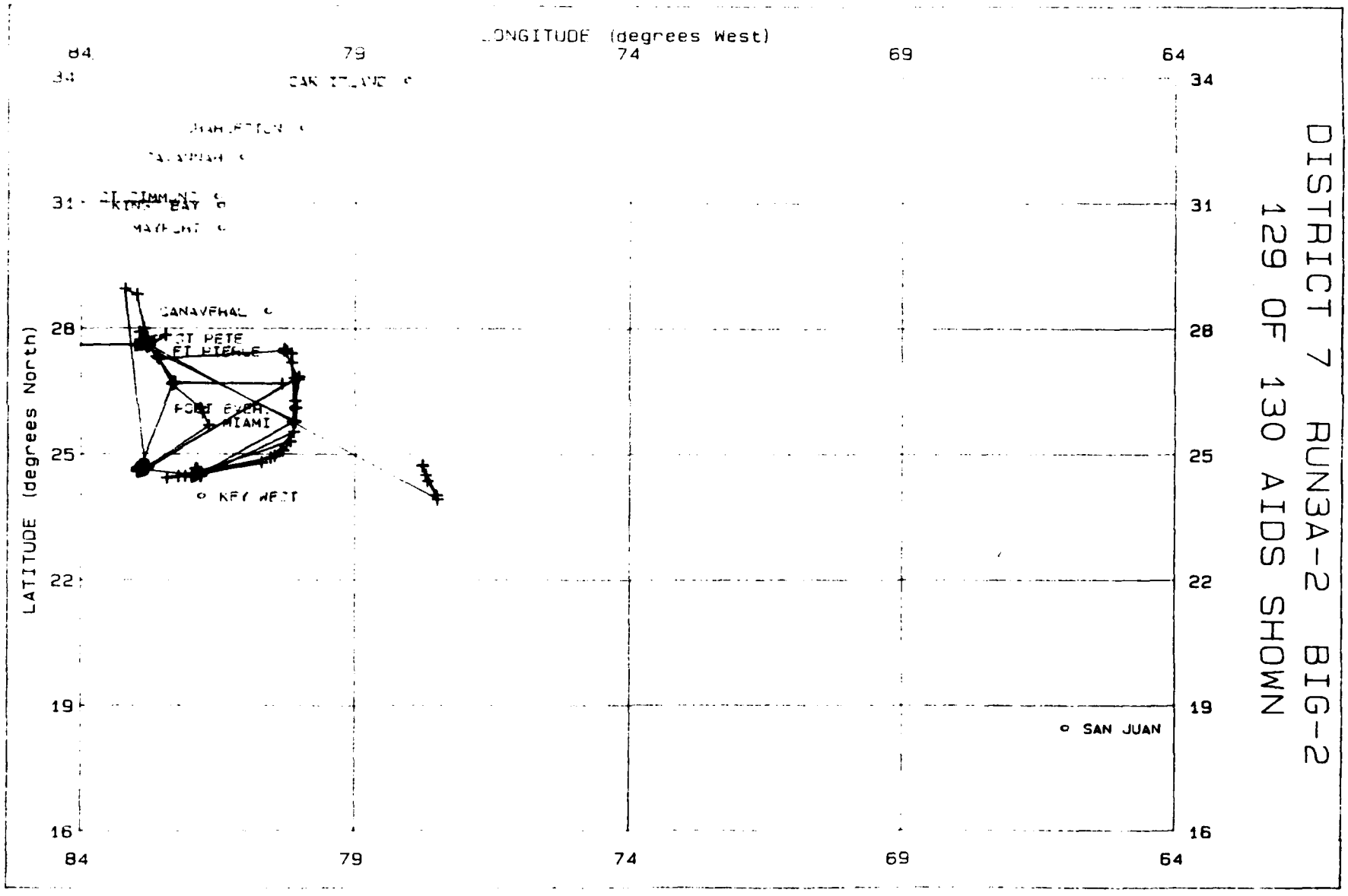

DISTRICT 7 RUN1-1 SMALL-1
307 OF 308 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
64
69
74
79
84
34
31
28
25
22
19
16
SAN JUAN
KEY WEST

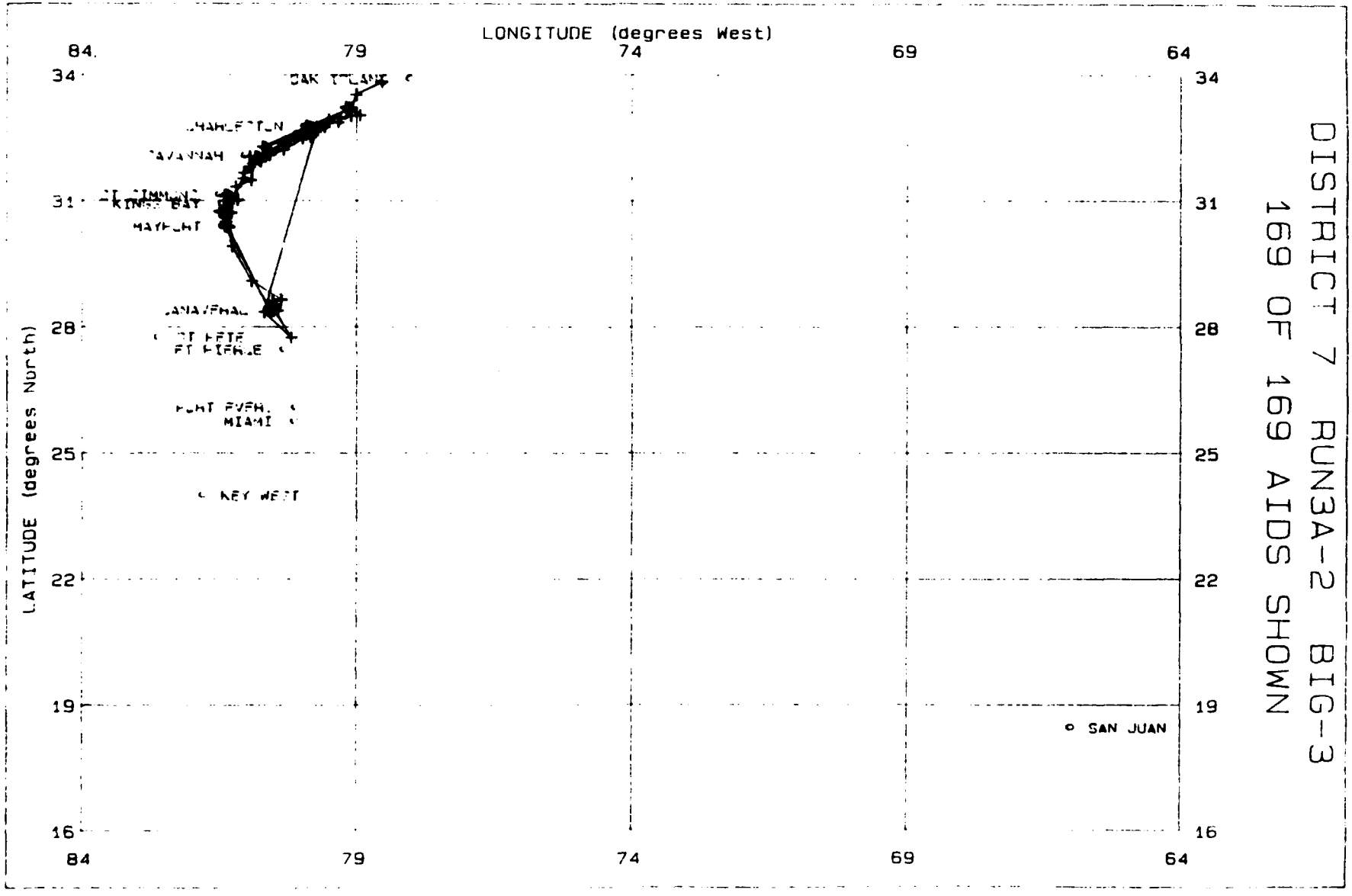

DISTRICT 7 RUN2A-2 BIG-2
169 OF 170 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
CANAVERAL
FT PIERCE
KEY WEST


DISTRICT 7 RUN2A-2 BIG-3
312 OF 312 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAN JUAN
KEY WEST


DISTRICT 7 RUN2A-2 SMALL-2
107 OF 107 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
84
79
74
69
64
34
31
28
25
22
19
16
CANAVERAL
ST PETE
FT PIERCE
MIAMI
KEY WEST
SAN JUAN

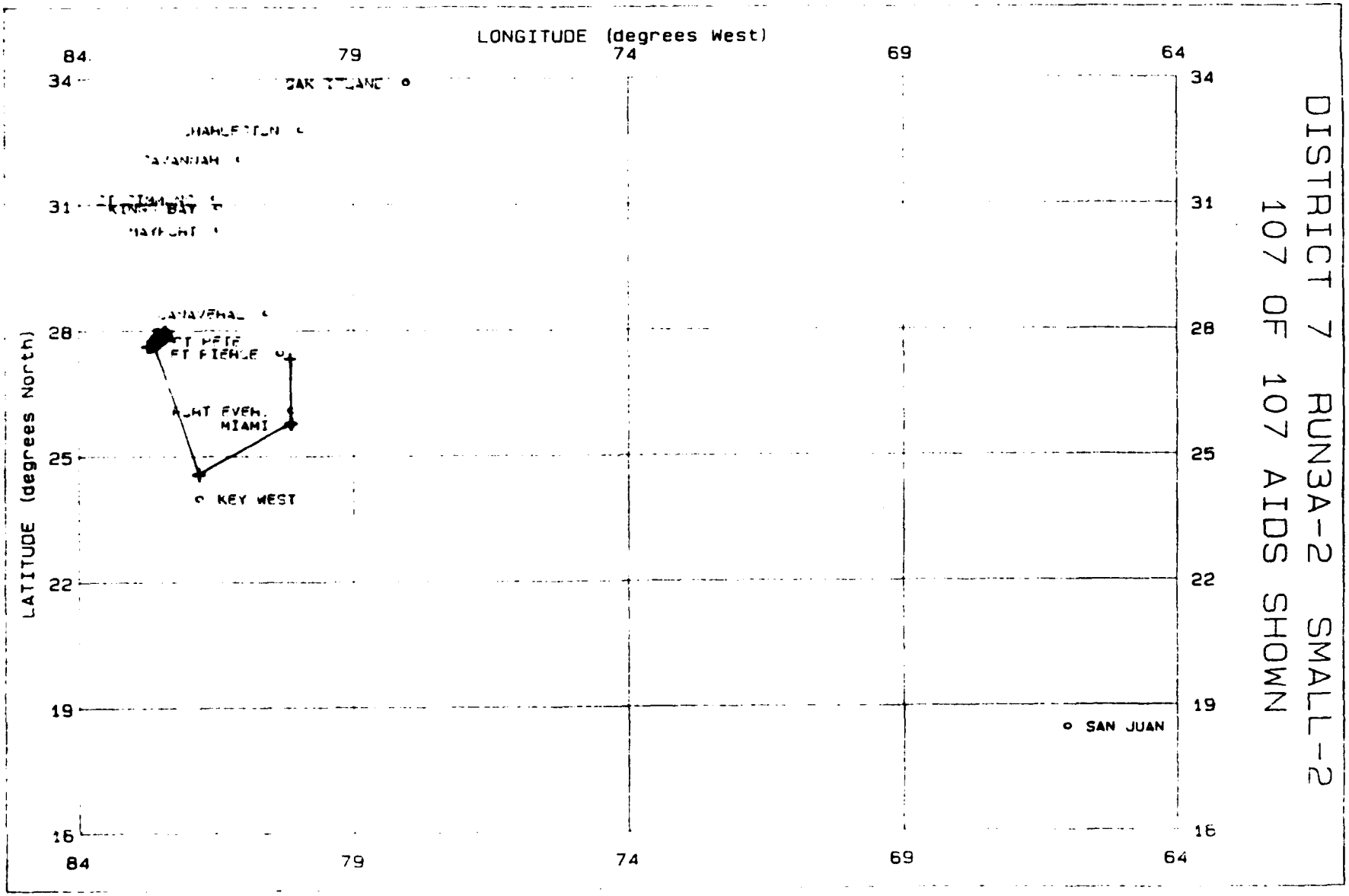

LONGITUDE (degrees West)
84
79
74
69
64
34
31
28
25
22
19
16
LATITUDE (degrees North)
CAR
SAVANNAH
KEY WEST
MIAMI
SAN JUAN
DISTRICT 7 RUN2A-2 SMALL-3
134 OF 134 AIDS SHOWN

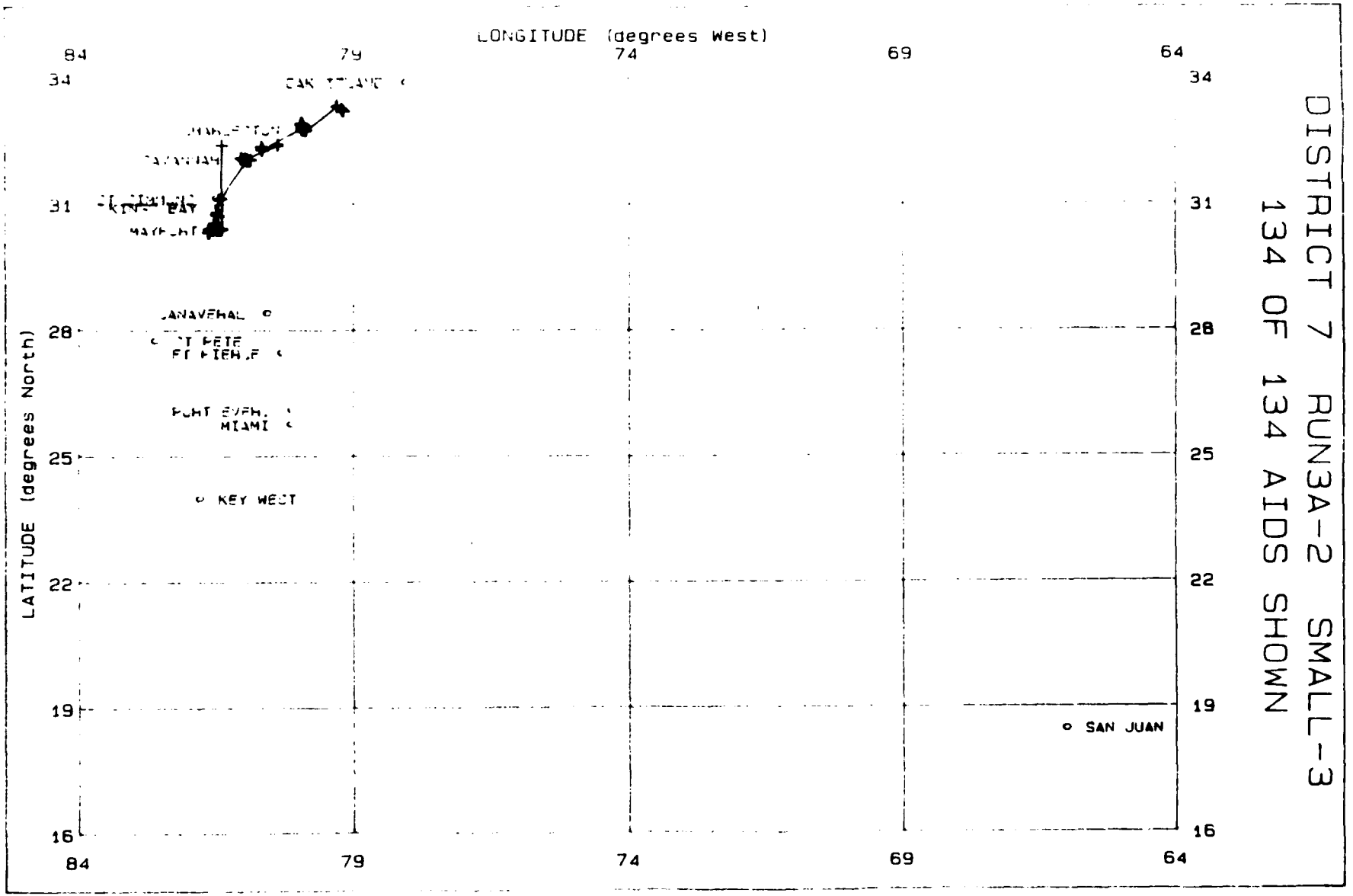

DISTRICT 7 RUN3A-2 BIG-2
129 OF 130 AIDS SHOWN
LONGITUDE (degrees West)
84
79
74
69
64
34
31
28
25
22
19
16
LATITUDE (degrees North)
CANAVERAL
FT PETE
FT PIERCE
FORT BEACH
MIAMI
KEY WEST
SAN JUAN

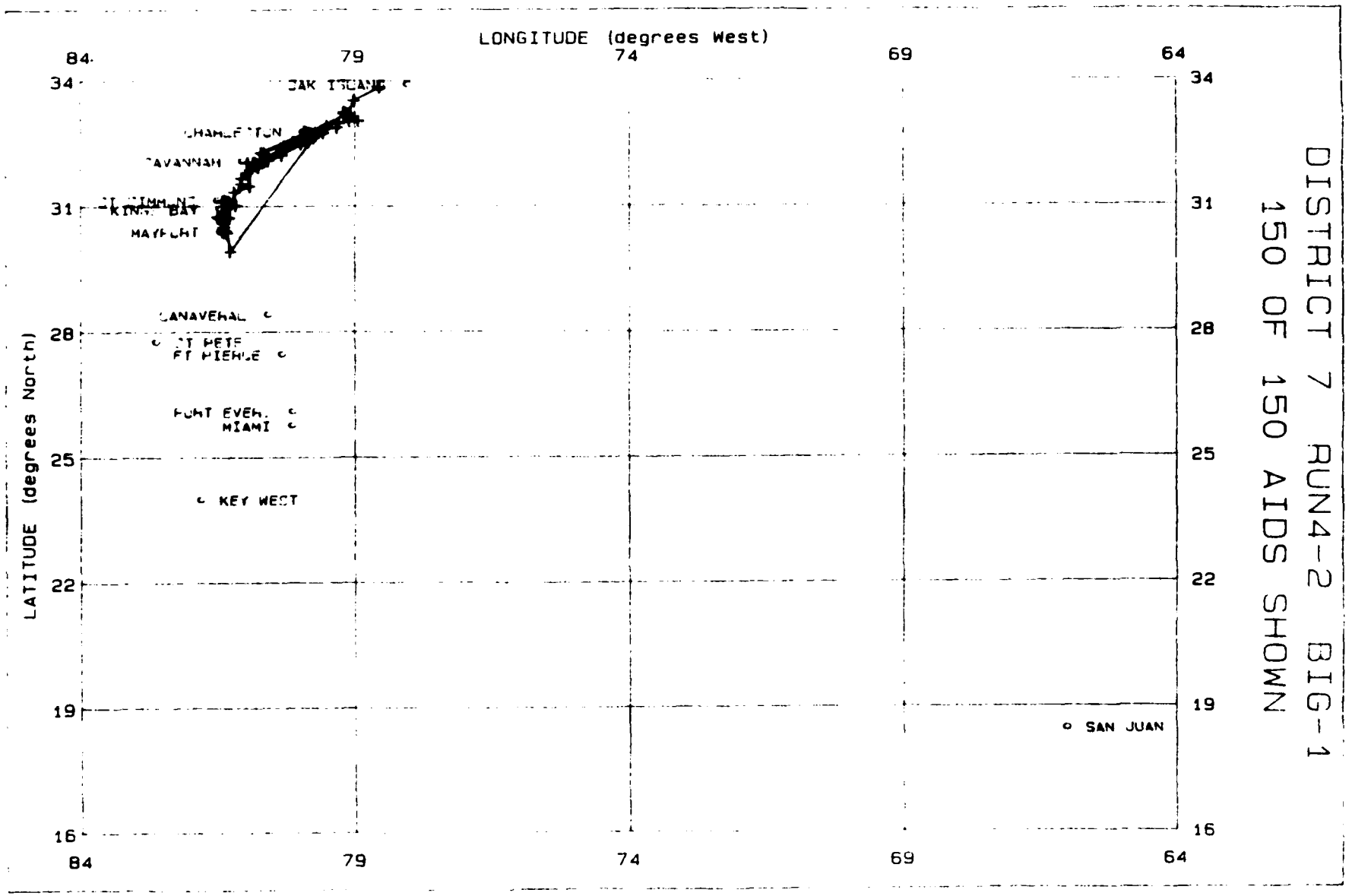


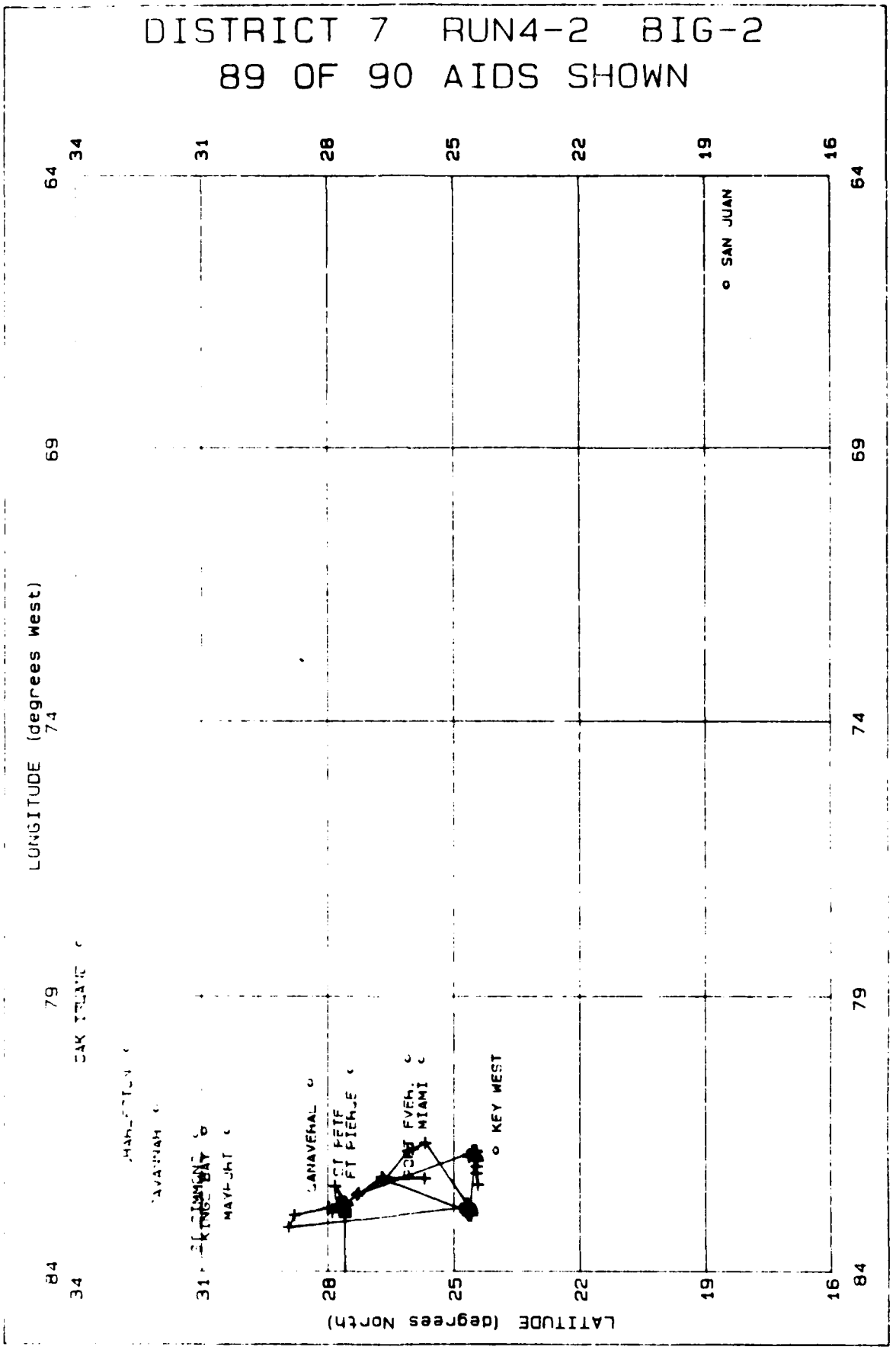
DISTRICT 7 RUN3A-2 BIG-3
169 OF 169 AIDS SHOWN

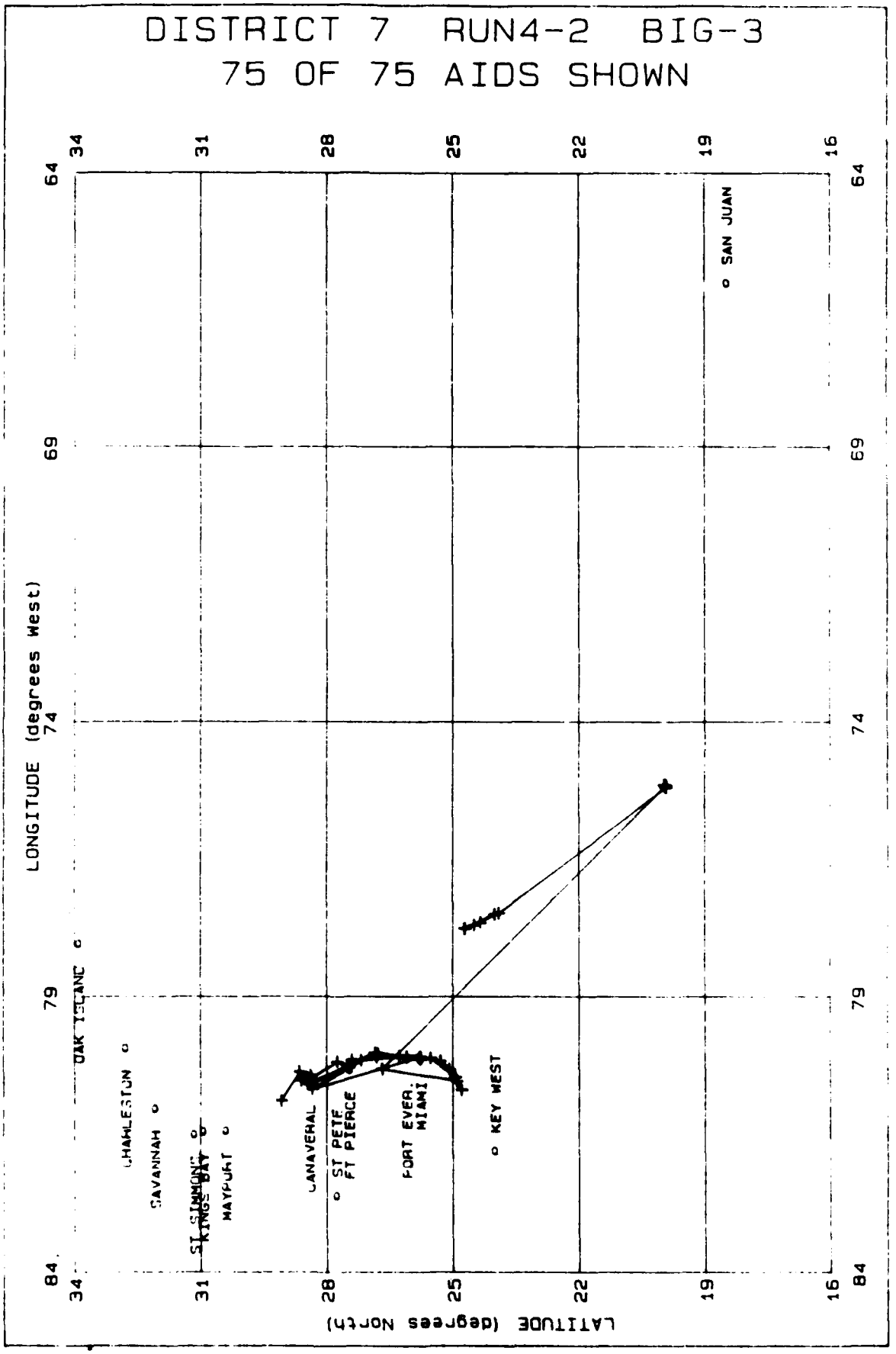
DISTRICT 7 RUN3A-2 BIG-4
183 OF 183 AIDS SHOWN
LATITUDE (degrees North)
LONGITUDE (degrees West)
34
31
28
25
22
19
16
64
69
74
79
84
JAN
KEY WEST

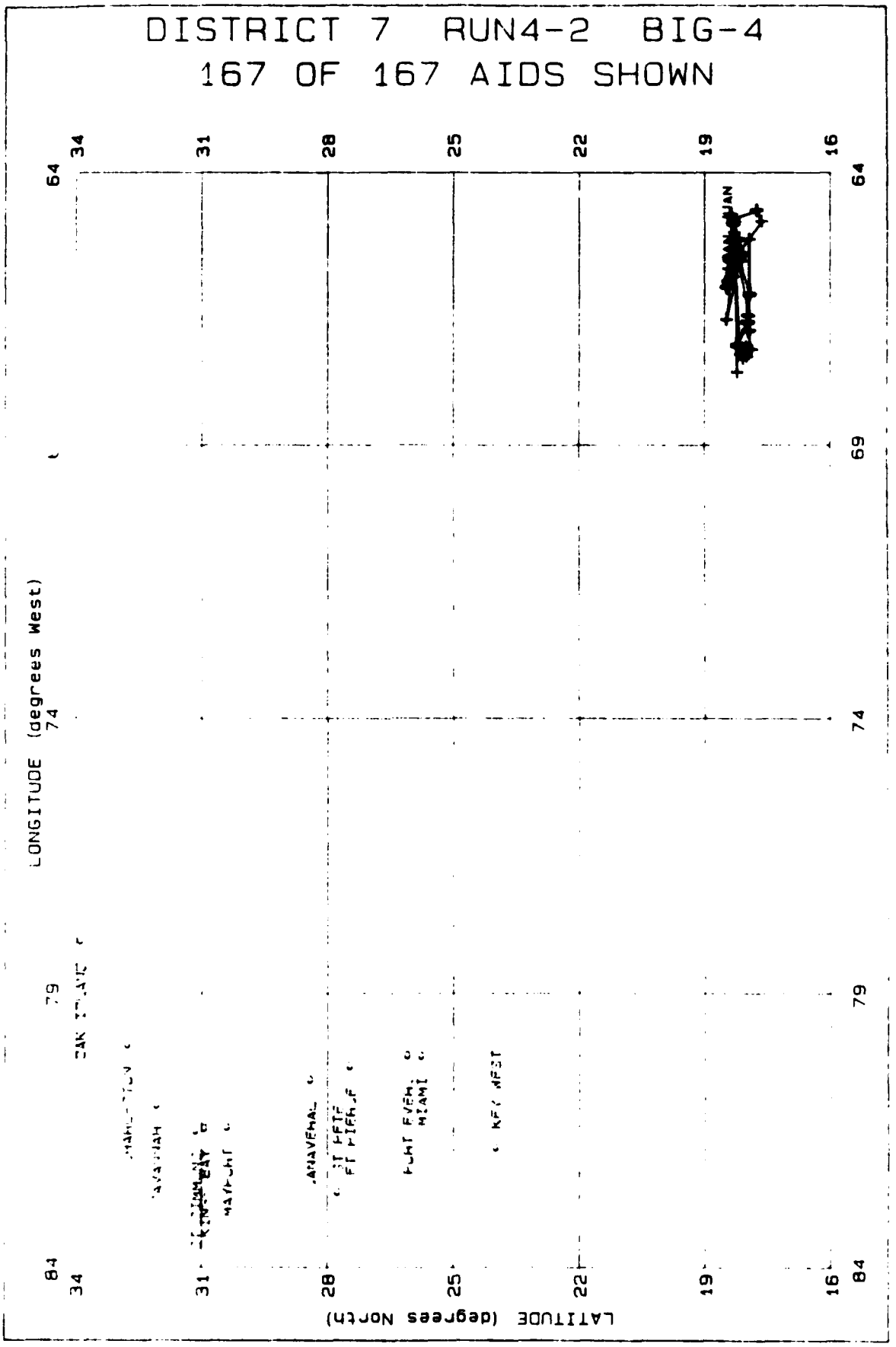

LONGITUDE (degrees West)
84
79
74
69
64
34
31
28
25
22
19
16
LATITUDE (degrees North)
KEY WEST
SAN JUAN
DISTRICT 7 RUN3A-2 SMALL-2
107 OF 107 AIDS SHOWN

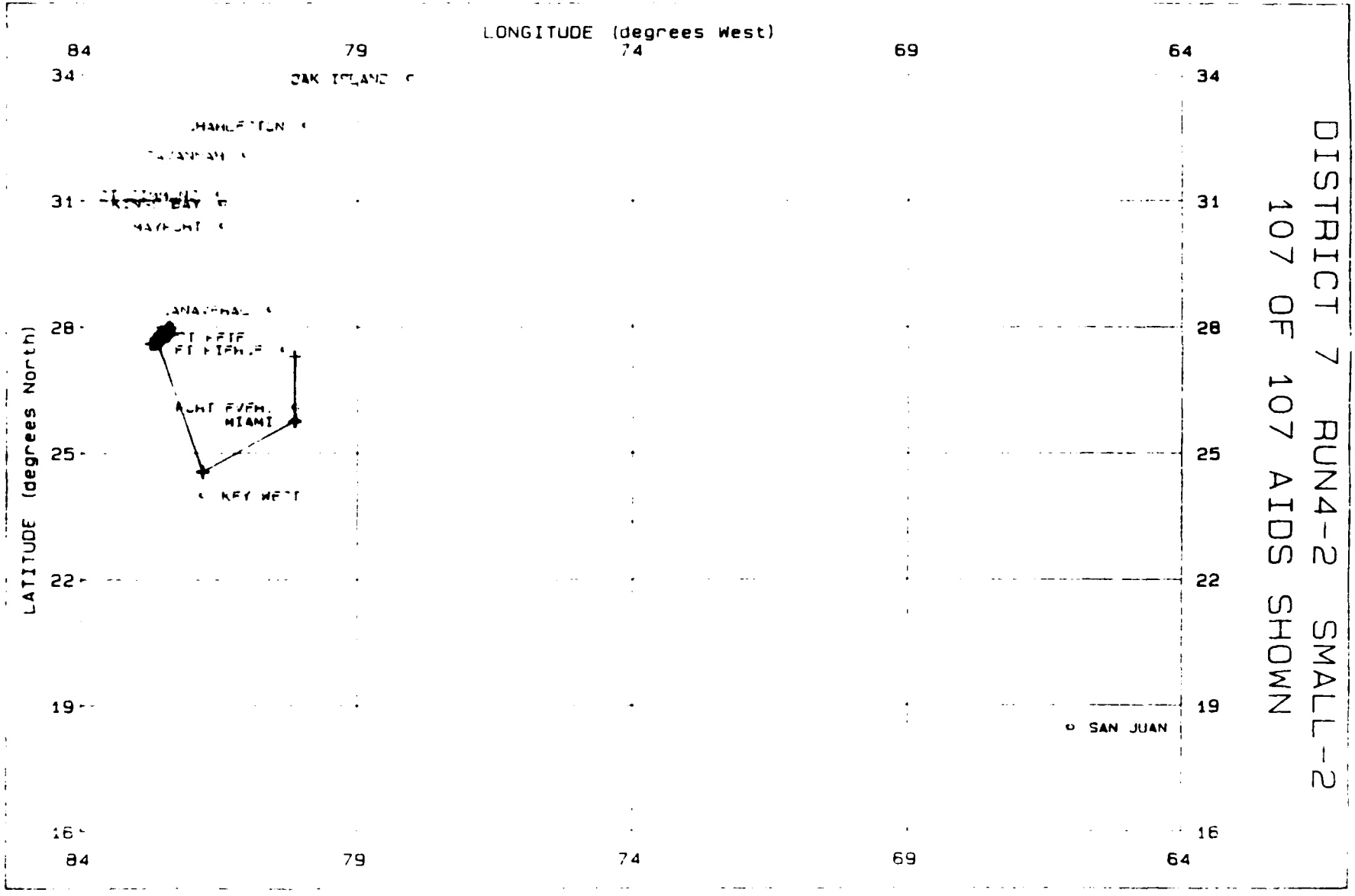

DISTRICT 7 RUN3A-2 SMALL-3
134 OF 134 AIDS SHOWN
LONGITUDE (degrees West)
84
79
74
69
64
34
31
28
25
22
19
16
LATITUDE (degrees North)
CANAVERAL
FT PIERCE
MIAMI
KEY WEST
SAN JUAN


DISTRICT 7 RUN4-2 BIG-1
150 OF 150 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
84
79
74
69
64
34
31
28
25
22
19
16
MAYPORT
CANAVERAL
FT PIERCE
FORT EVEN.
MIAMI
KEY WEST
SAN JUAN

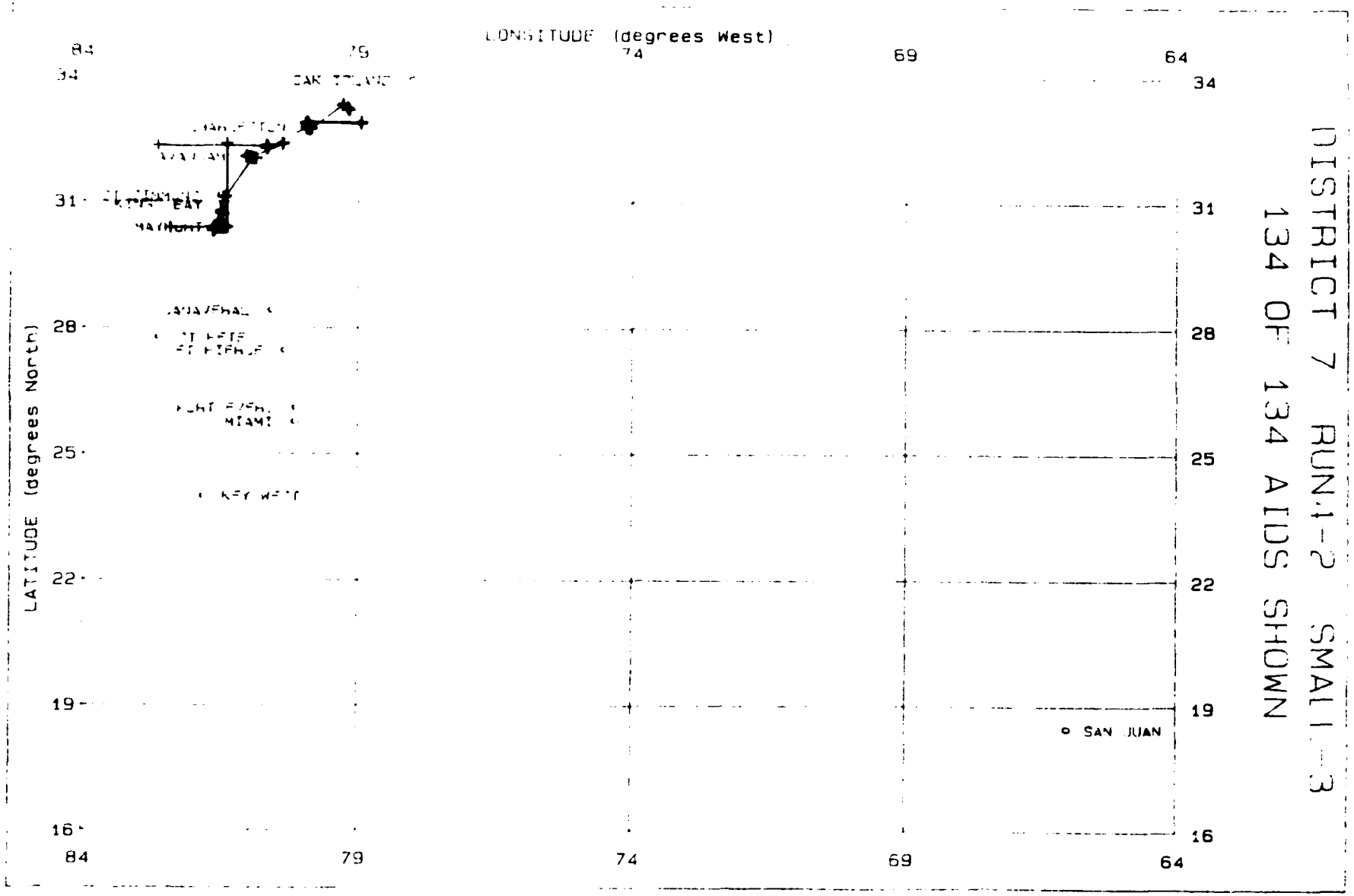

DISTRICT 7 RUN4-2 BIG-2
89 OF 90 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAN JUAN
KEY WEST
MIAMI
FT PIERCE
CANAVERAL


DISTRICT 7 RUN4-2 BIG-3
75 OF 75 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
64
69
74
79
84
34
31
28
25
22
19
16
SAN JUAN
KEY WEST
FORT EVER. MIAMI
ST PETE FT PIERCE
CANAVERAL
MAYPORT
SAVANNAH
CHARLESTON
OAK ISLAND

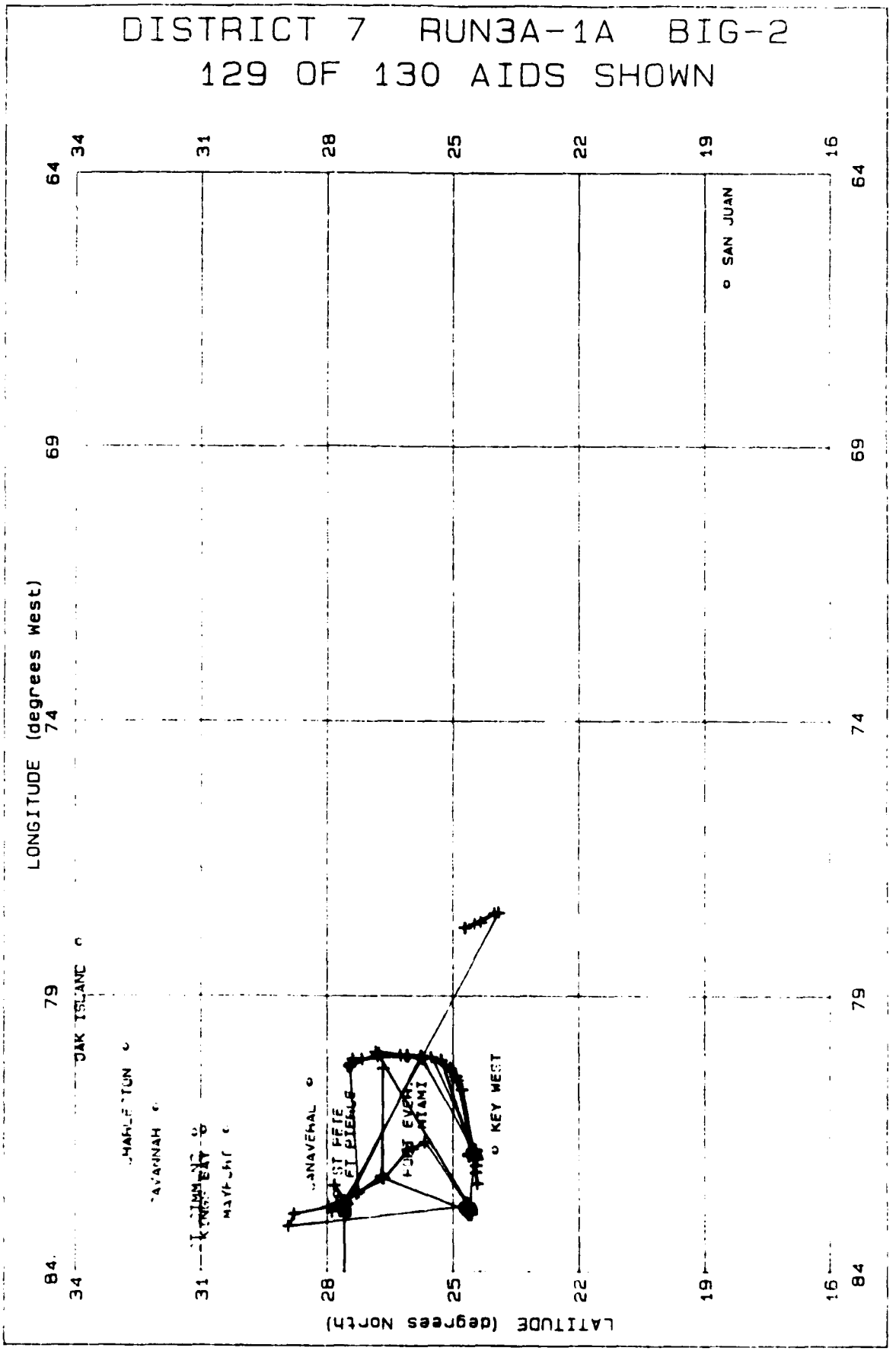

DISTRICT 7 RUN4-2 BIG-4
167 OF 167 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
64
34
31
28
25
22
19
16
69
74
79
84
SAN JUAN
ANAVEHAL
FT PIERCE
MIAMI
KEY WEST



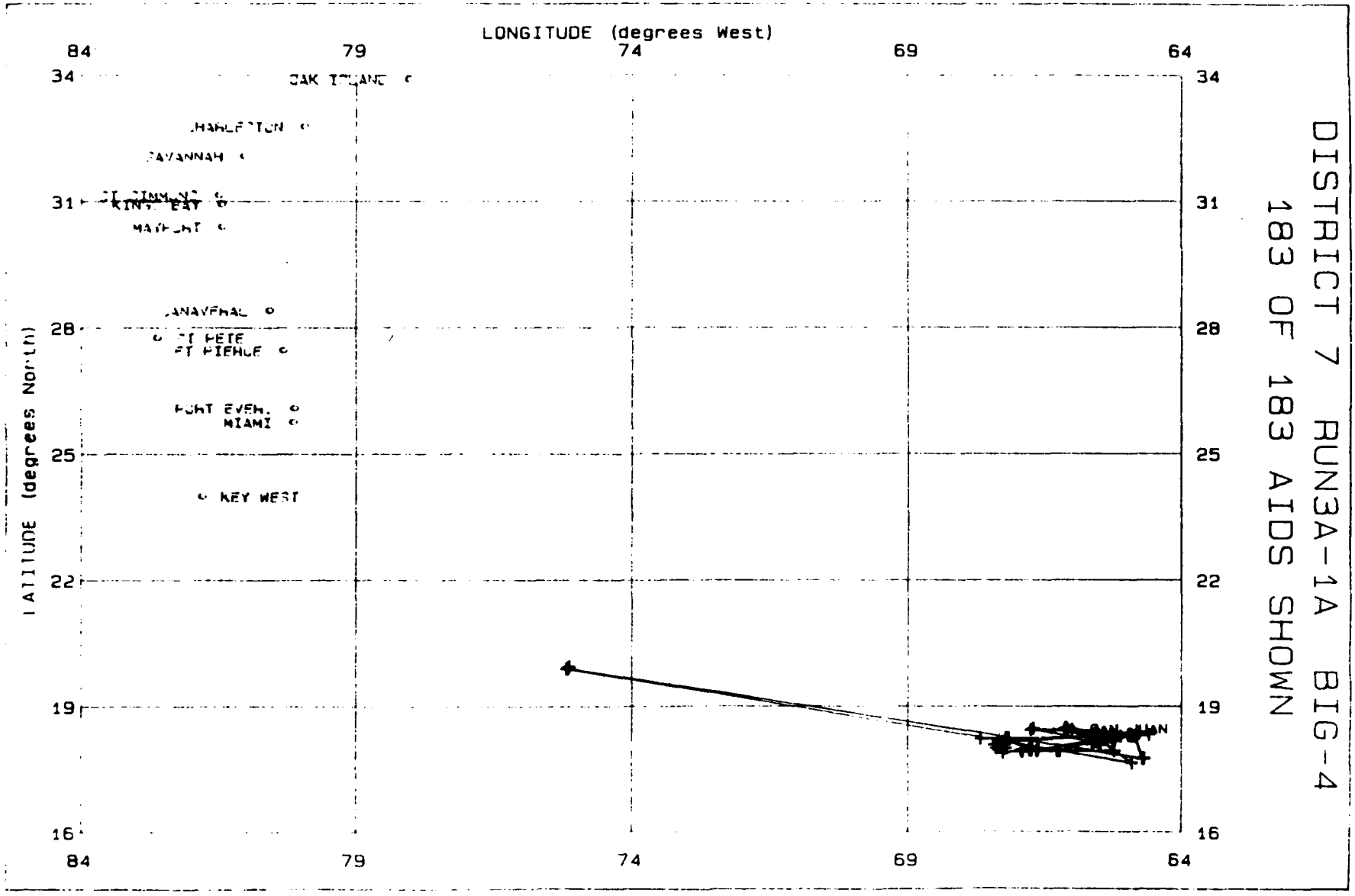
DISTRICT 7 RUN4-2 SMALL-2
107 OF 107 AIDS SHOWN

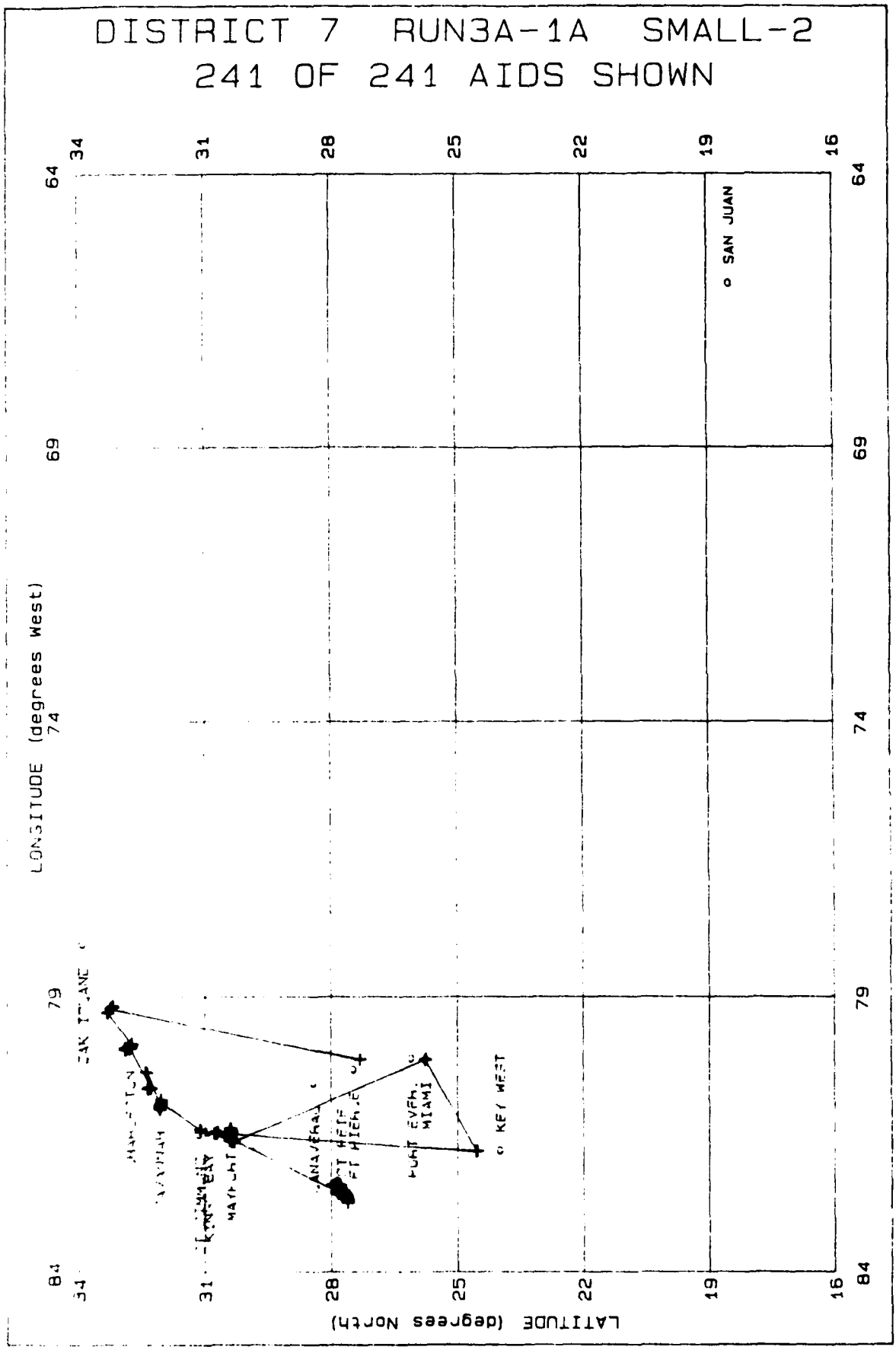


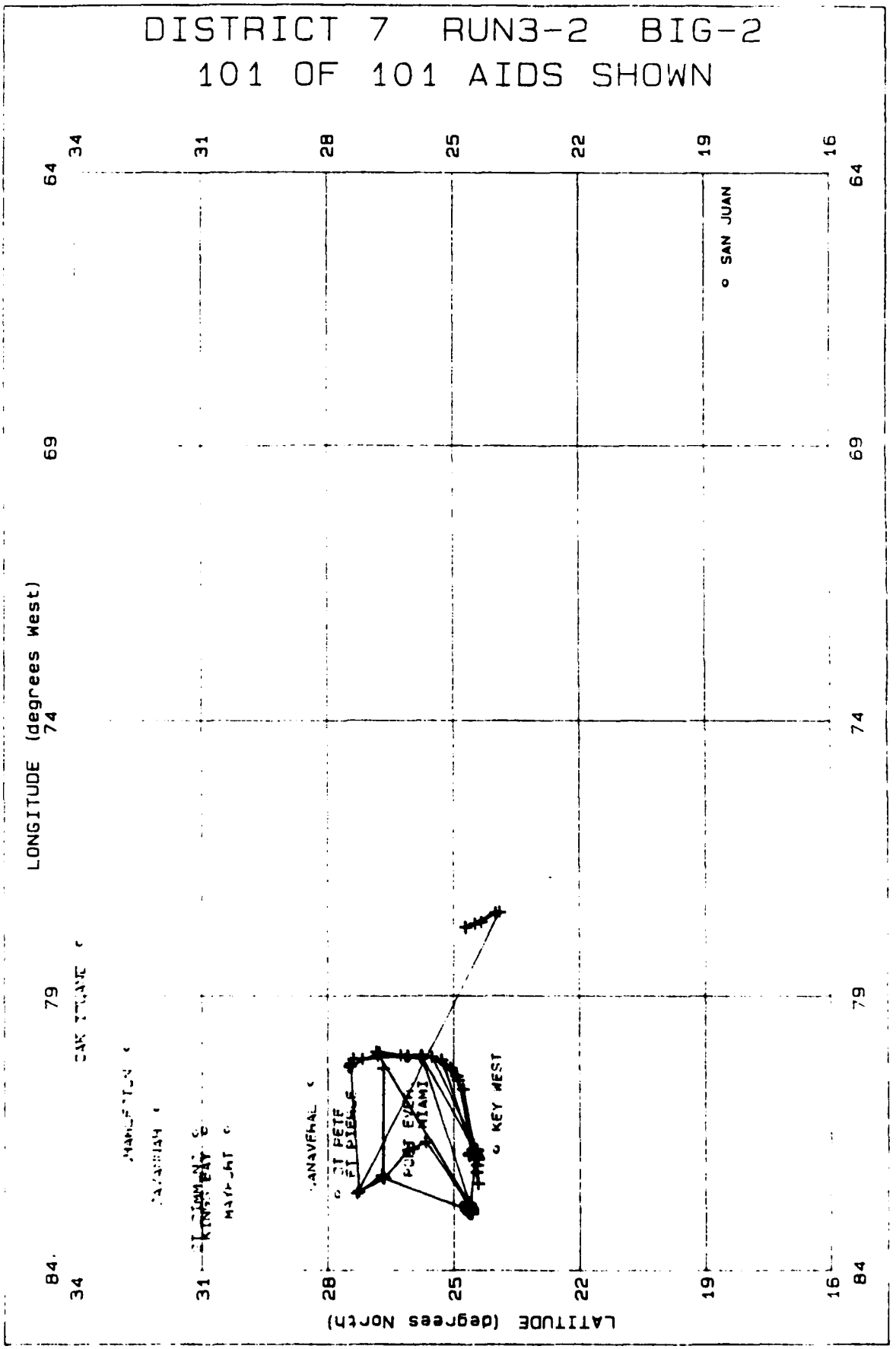
DISTRICT 7 RUN:1-2 SMALL-3
134 OF 134 AIDS SHOWN

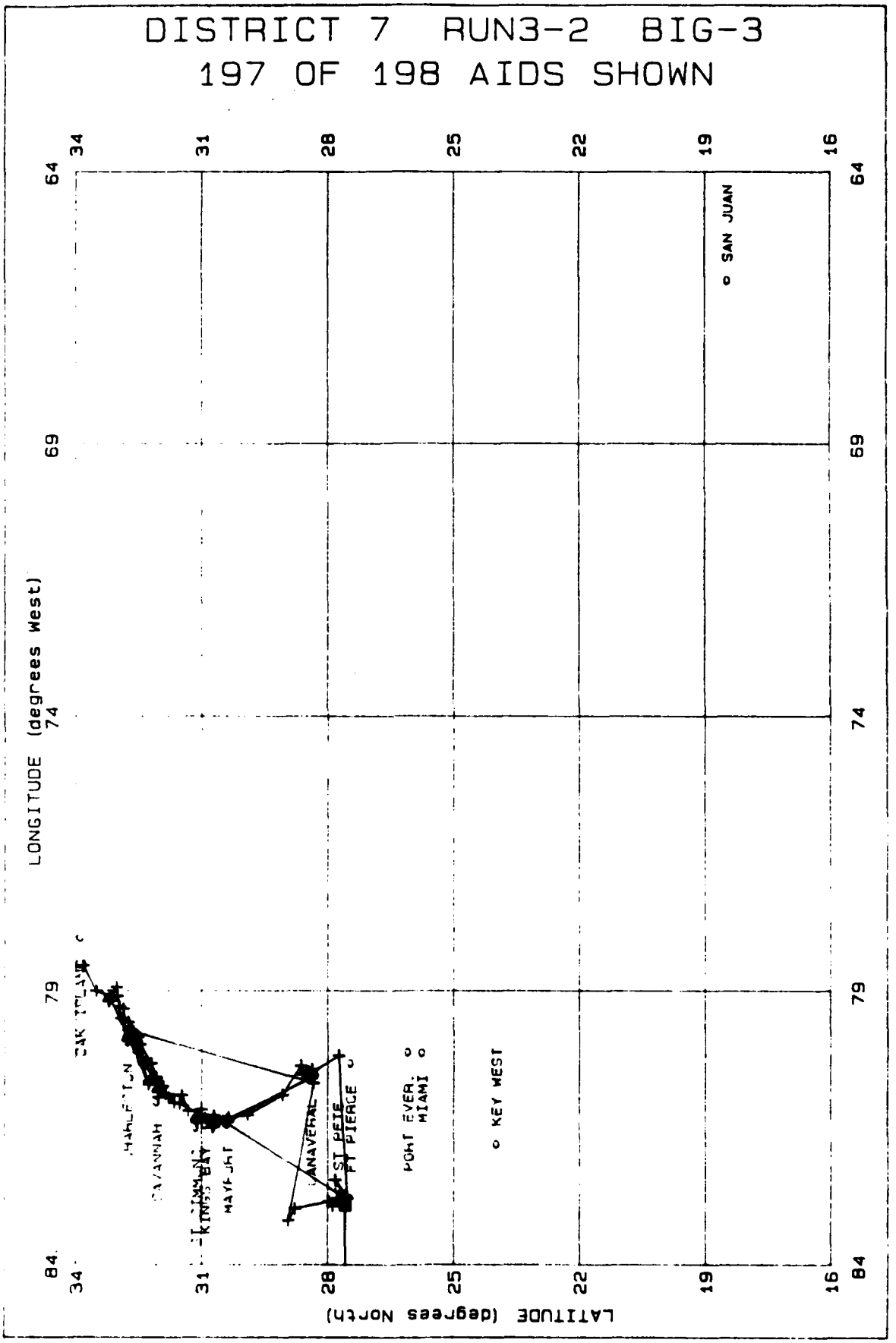

DISTRICT 7 RUN3A-1A BIG-2
129 OF 130 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAN JUAN
KEY WEST
MIAMI
FT PIERCE
CANAVERAL
SAVANNAH
CHARLESTON
OAK ISLAND

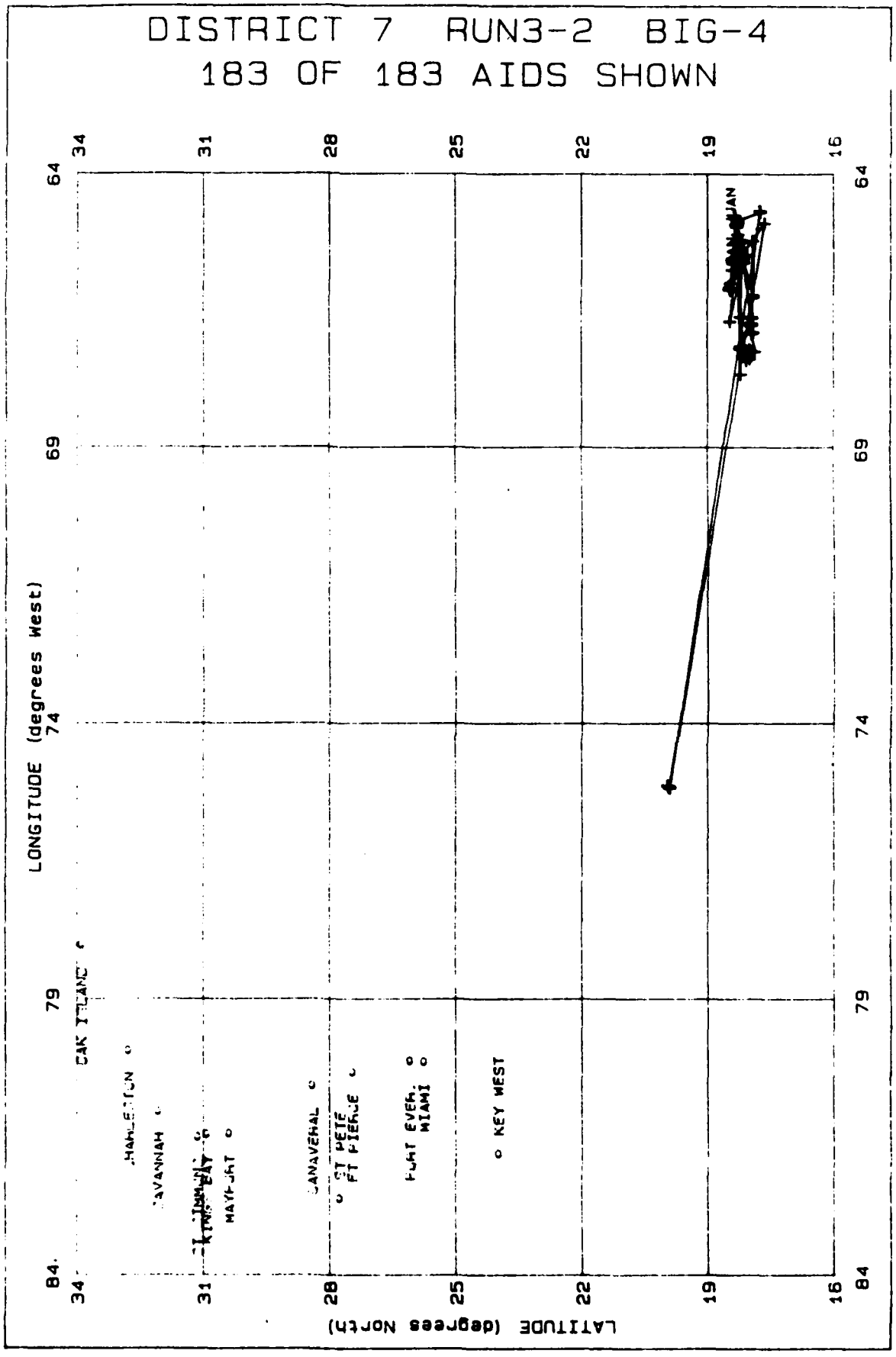
DISTRICT 7 RUN3A-1A BIG-3
169 OF 169 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAN JUAN
64
69
74
79
84
34
31
28
25
22
19
16

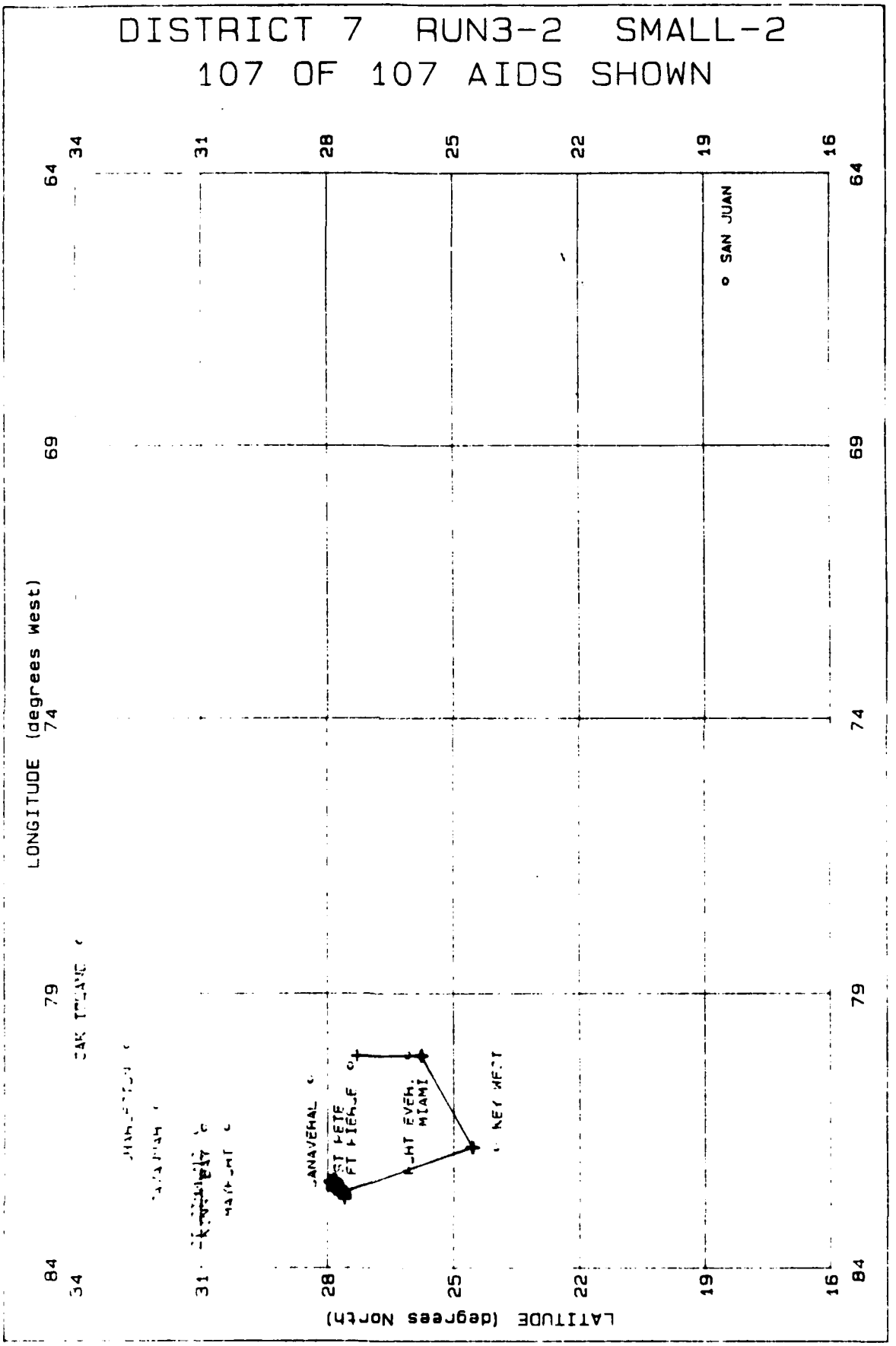

LONGITUDE (degrees West)
84
79
74
69
64
34
31
28
25
22
19
16
LATITUDE (degrees North)
CAK ISLAND
CHARLESTON
SAVANNAH
MAYPORT
CANAVERAL
FT PIERCE
FORT EVEN.
MIAMI
KEY WEST
SAN JUAN
DISTRICT 7 RUN3A-1A BIG-4
183 OF 183 AIDS SHOWN

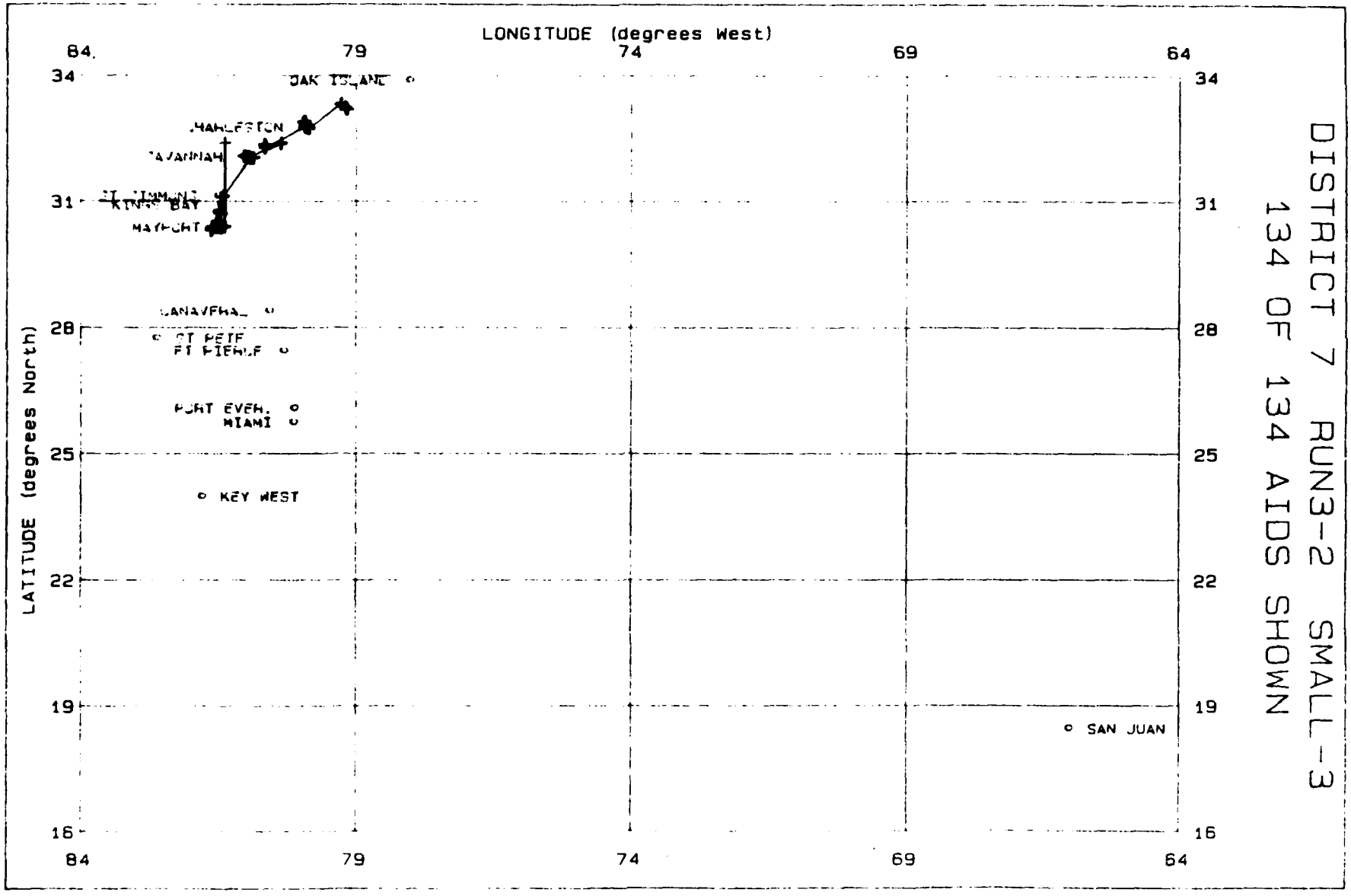

DISTRICT 7 RUN3A-1A SMALL-2
241 OF 241 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
64
69
74
79
84
34
31
28
25
22
19
16
SAN JUAN
KEY WEST


DISTRICT 7 RUN3-2 BIG-2
101 OF 101 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAN JUAN
KEY WEST
MIAMI
FT PIERCE
CANAVERAL

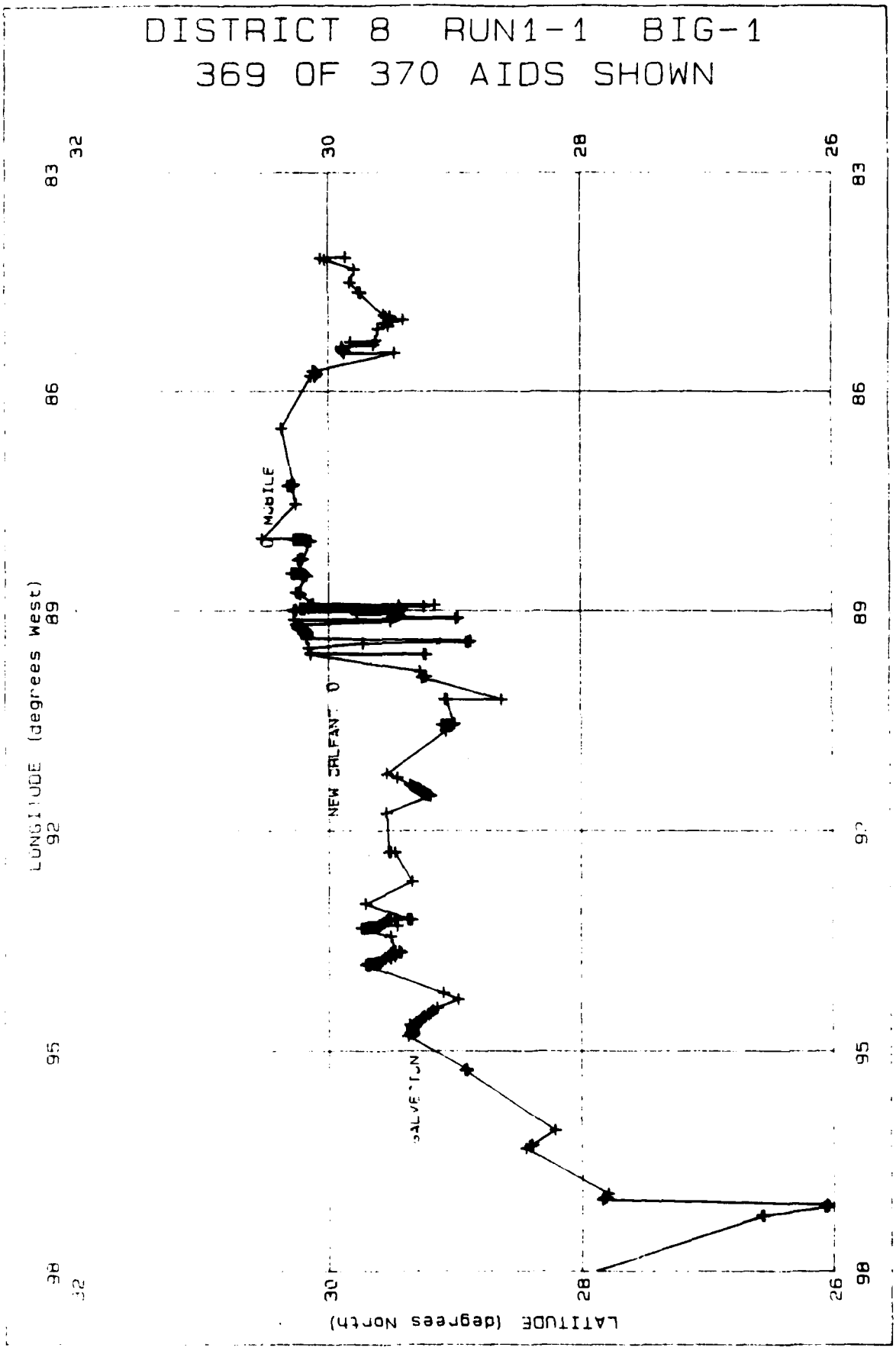

DISTRICT 7 RUN3-2 BIG-3
197 OF 198 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAN JUAN
KEY WEST
MIAMI
FT PIERCE
ST PETE
CANAVERAL
34
31
28
25
22
19
16
64
69
74
79
84

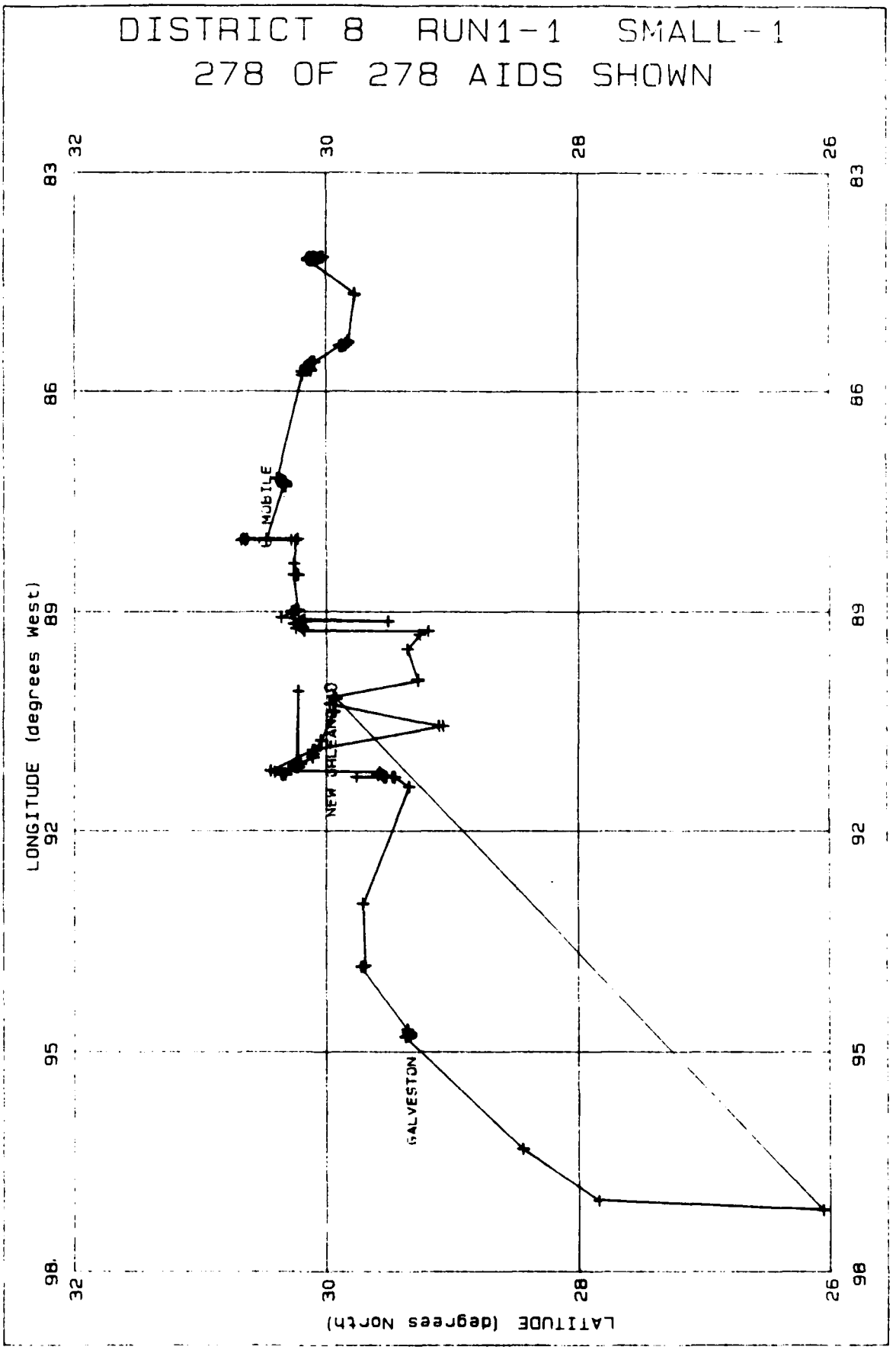

DISTRICT 7 RUN3-2 BIG-4
183 OF 183 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
84.
79
74
69
64
34
31
28
25
22
19
16
SAN JUAN
KEY WEST
MIAMI
FT PIERCE
CANAVERAL
SAVANNAH

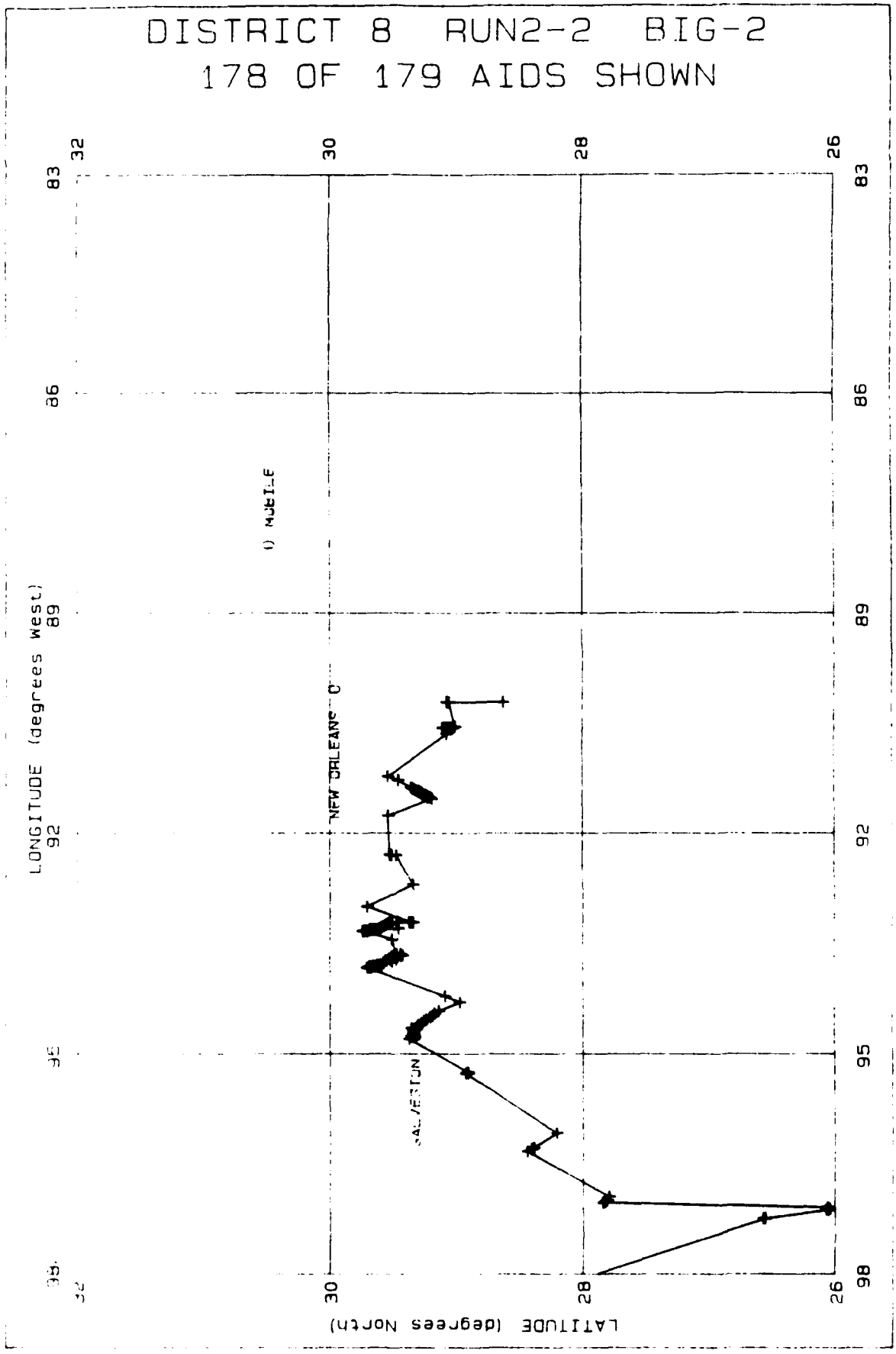

DISTRICT 7 RUN3-2 SMALL-2
107 OF 107 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
64
69
74
79
84
34
31
28
25
22
19
16
SAN JUAN
KEY WEST
LIGHT EVEN, MIAMI

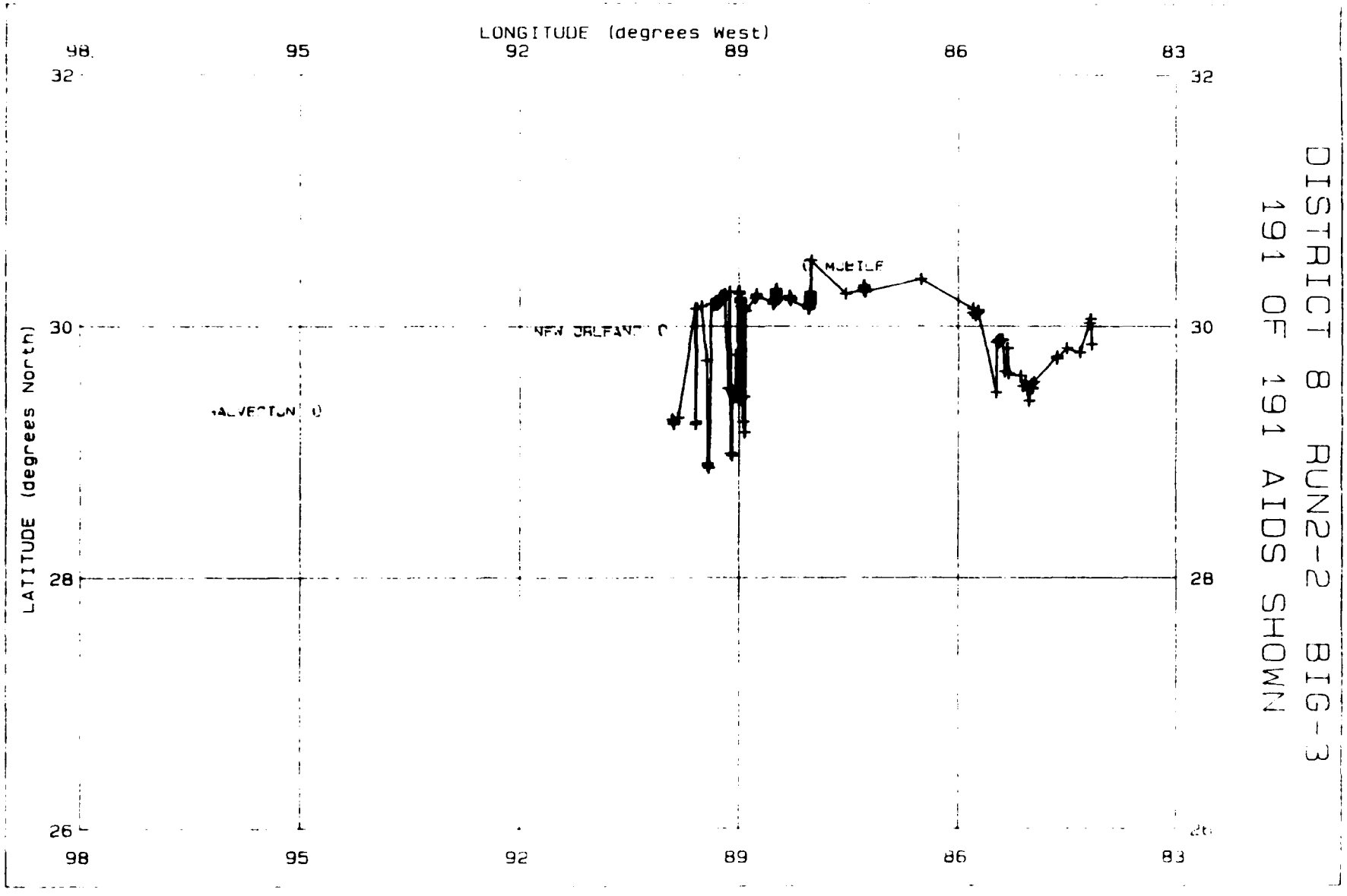


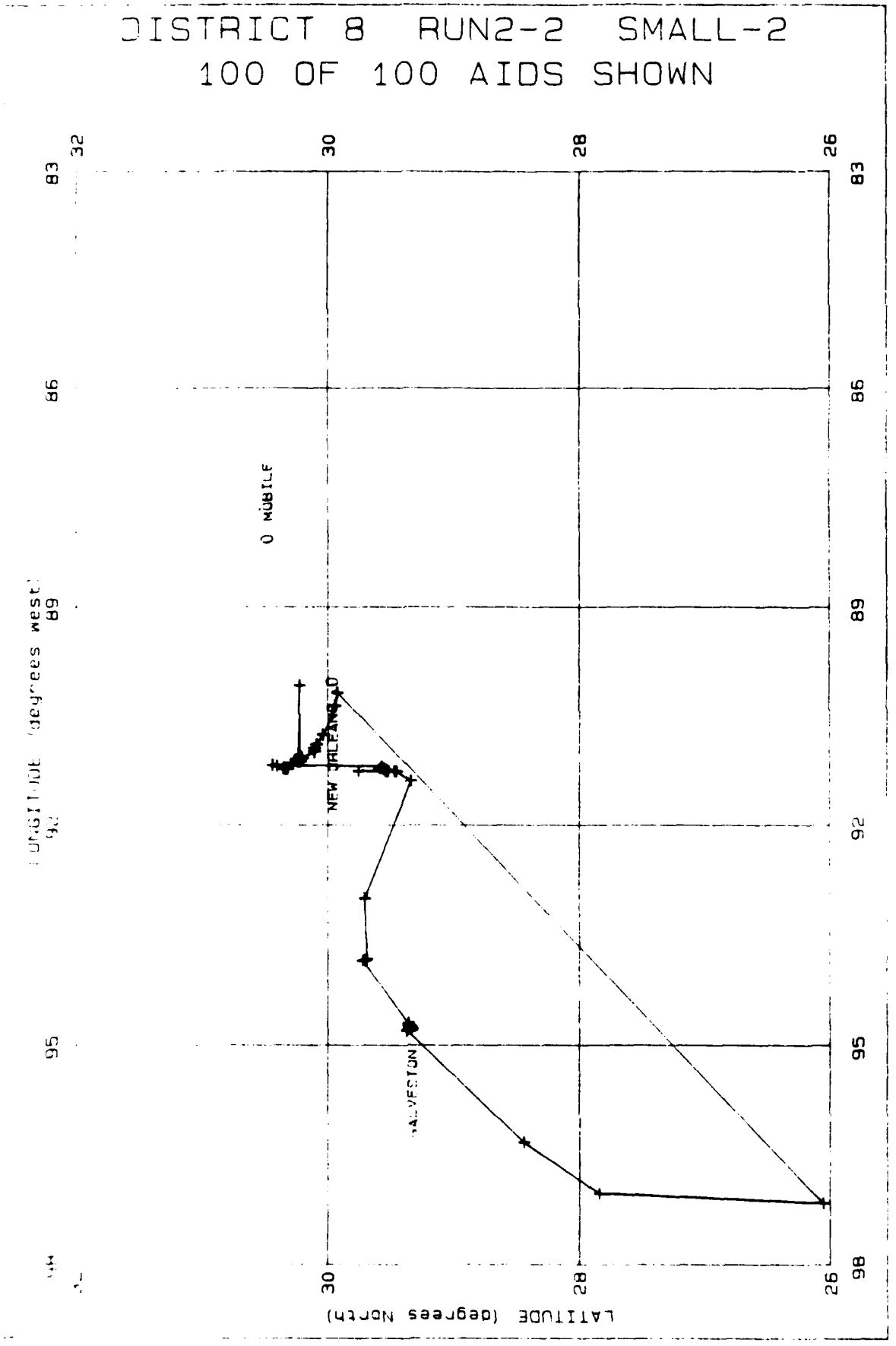
DISTRICT 7 RUN3-2 SMALL-3
134 OF 134 AIDS SHOWN

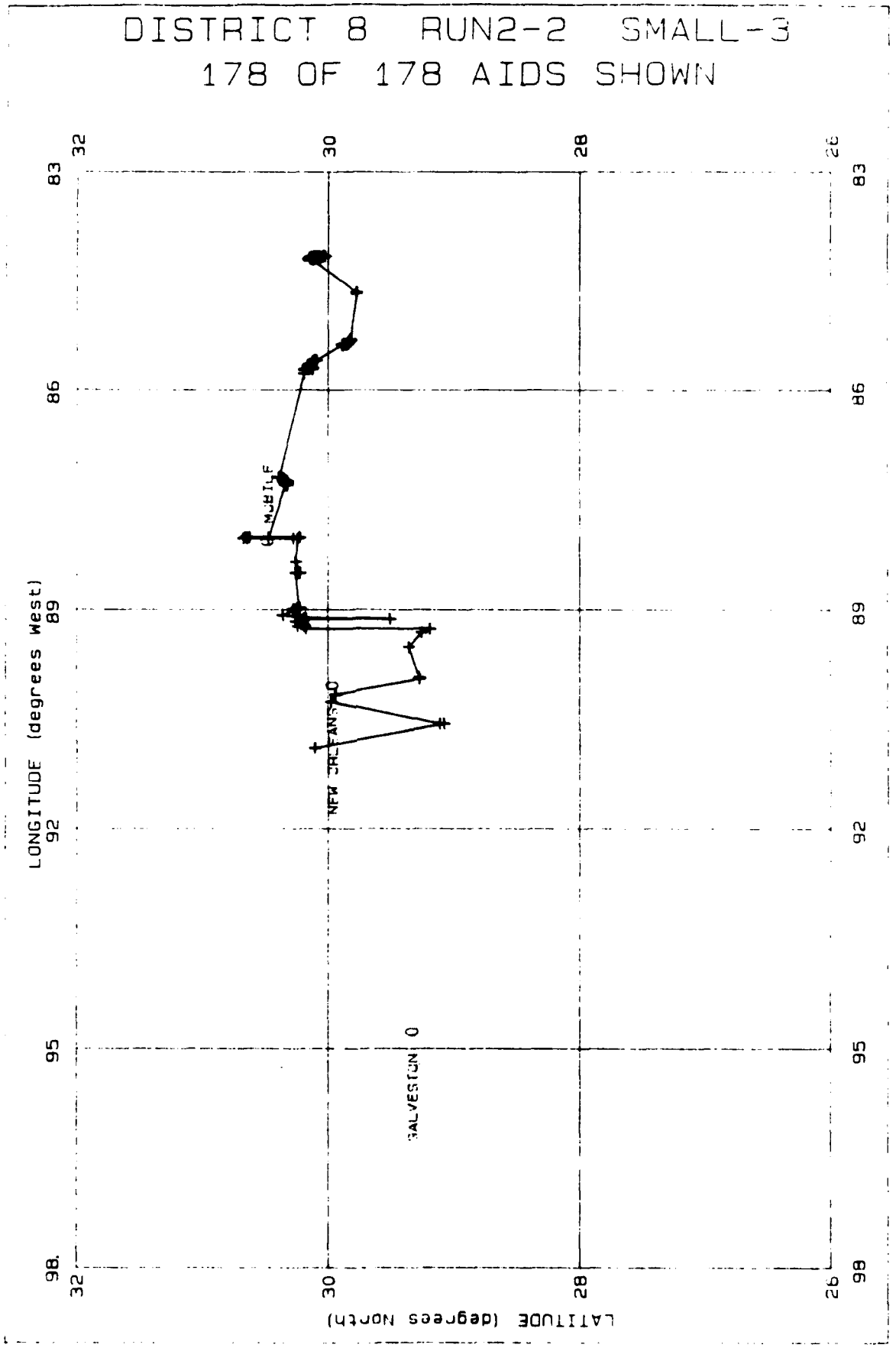

DISTRICT 8 RUN1-1 BIG-1
369 OF 370 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
MOBILE
NEW ORLEANS
GALVESTON
32
30
28
26
83
86
89
92
95
98


DISTRICT 8 RUN1-1 SMALL-1
278 OF 278 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
MOBILE
NEW ORLEANS
GALVESTON
83
86
89
92
95
98
32
30
28
26

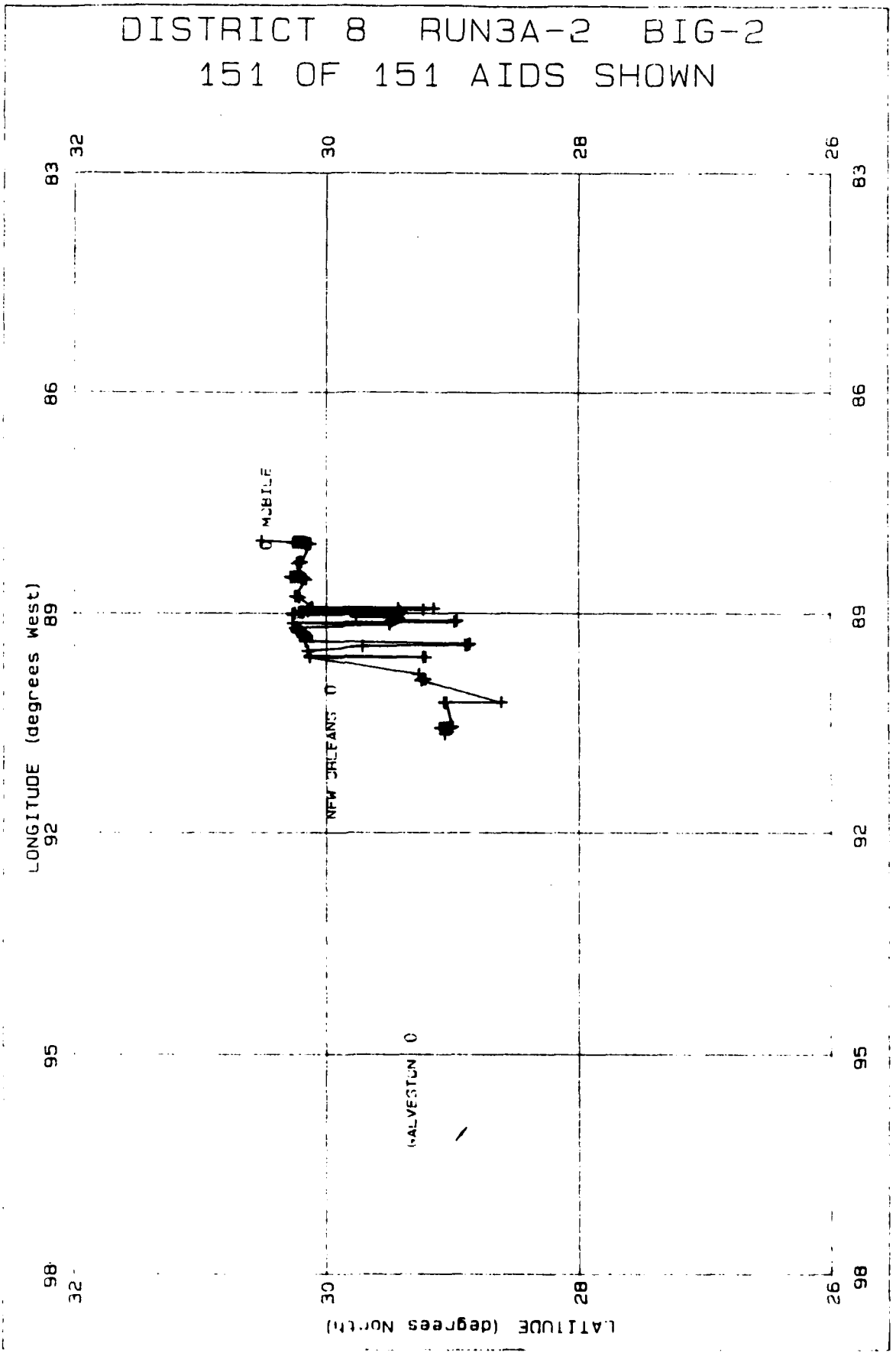

DISTRICT 8 RUN2-2 BIG-2
178 OF 179 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
MOBILE
NEW ORLEANS
GALVESTON


LONGITUDE (degrees West)
98
95
92
89
86
83
32
30
28
26
LATITUDE (degrees North)
MOBILE
NEW ORLEANS
GALVESTON
DISTRICT 8 RUN2-2 BIG-3
191 OF 191 AIDS SHOWN

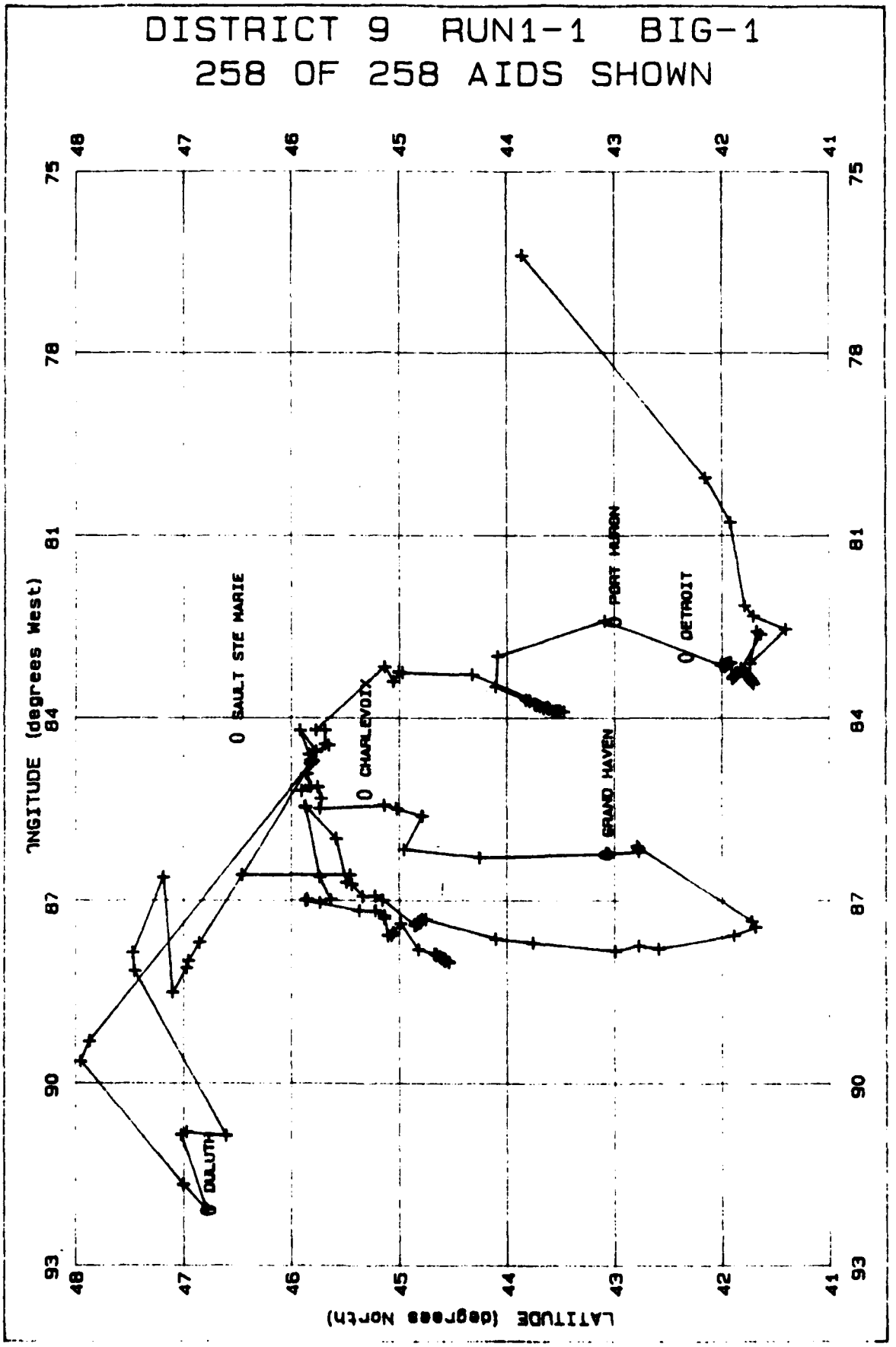

DISTRICT 8 RUN2-2 SMALL-2
100 OF 100 AIDS SHOWN
32
30
28
26
83
86
89
92
95
98
MOBILE
NEW ORLEANS
GALVESTON
LATITUDE (degrees North)

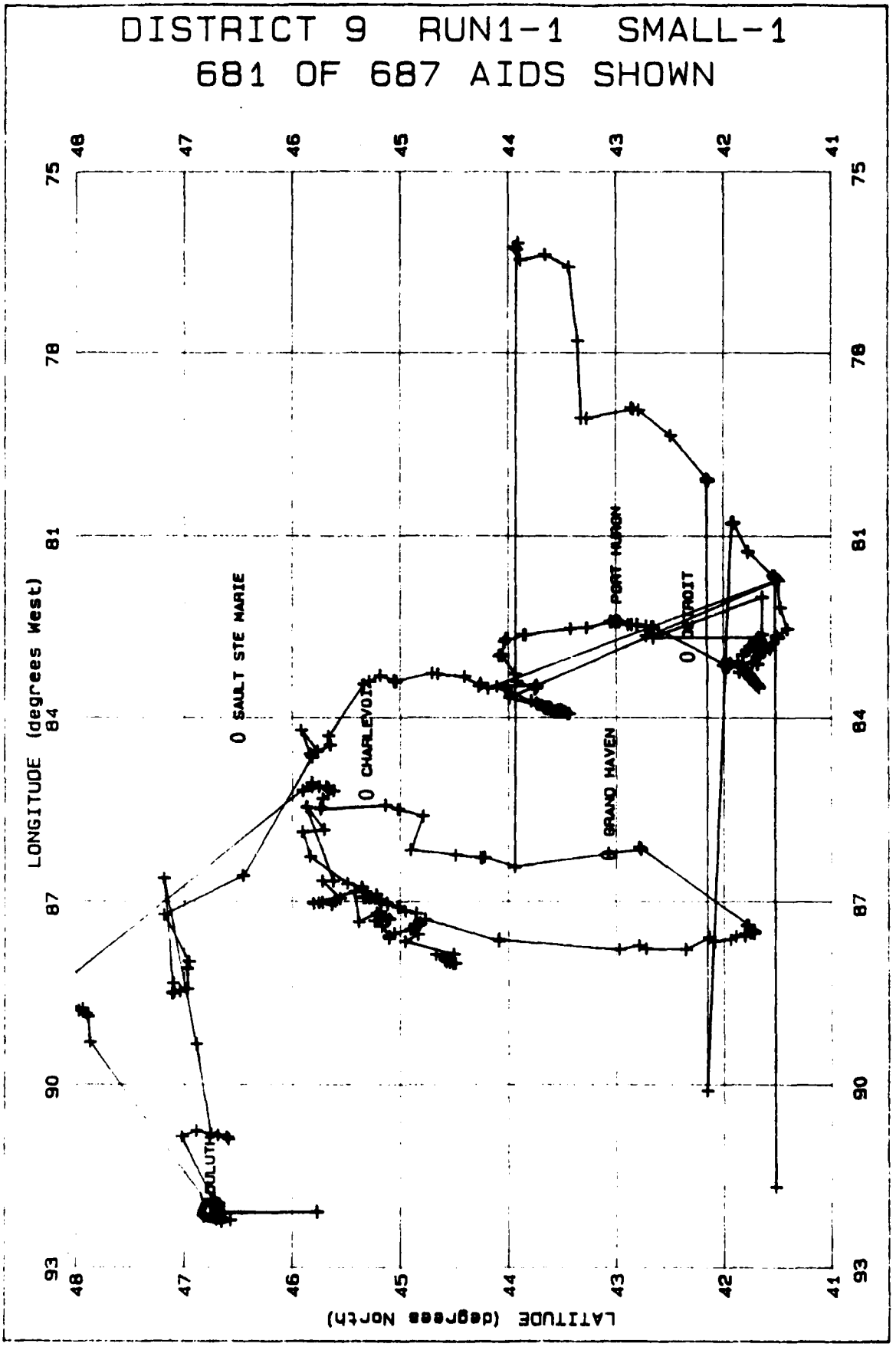

DISTRICT 8 RUN2-2 SMALL-3
178 OF 178 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
83
86
89
92
95
98
32
30
28
26
GALVESTON

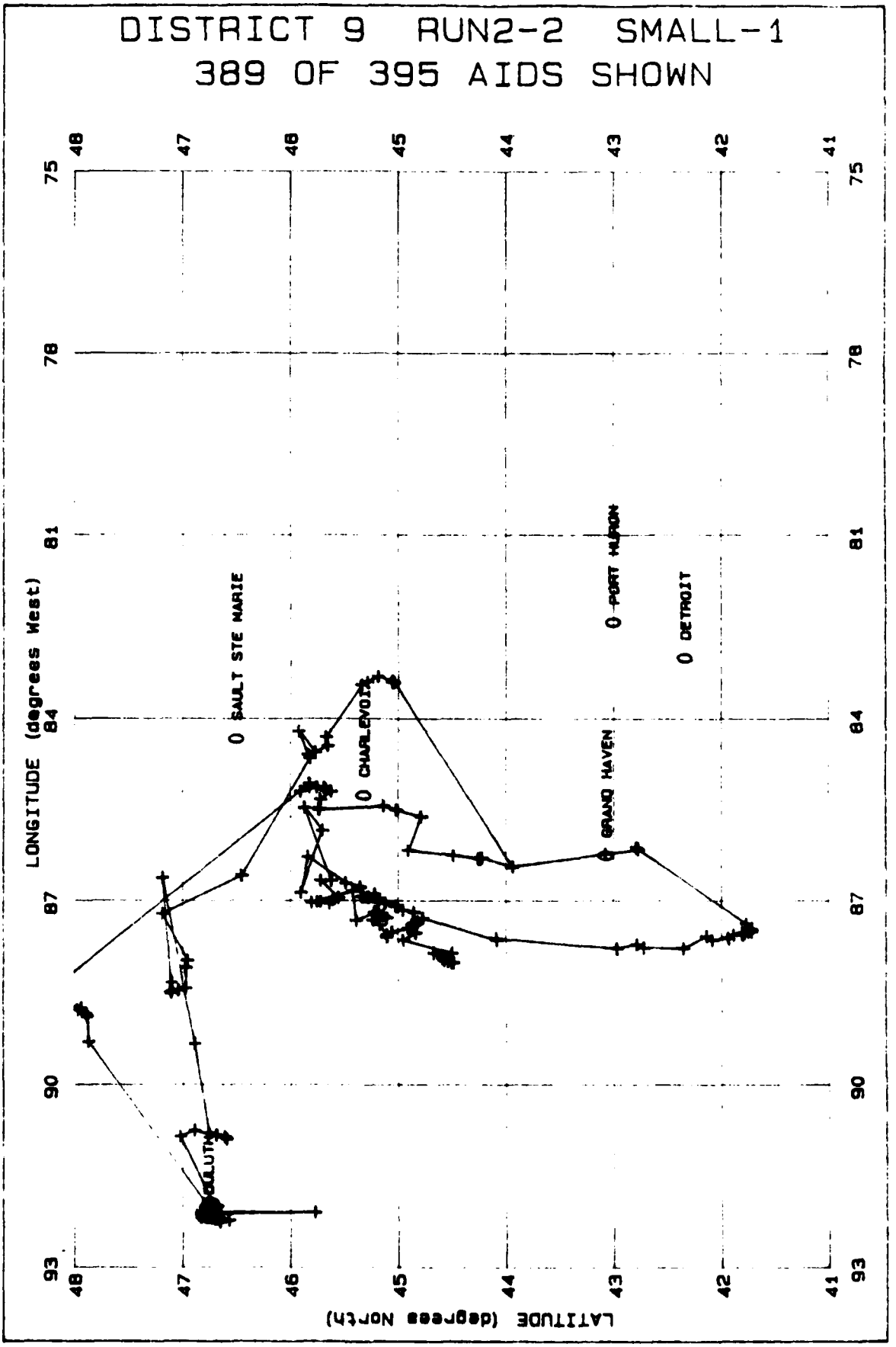
DISTRICT 8 RUN3A-2 BIG-1
160 OF 161 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
32
30
28
26
83
86
89
92
95
98
NEW ORLEANS

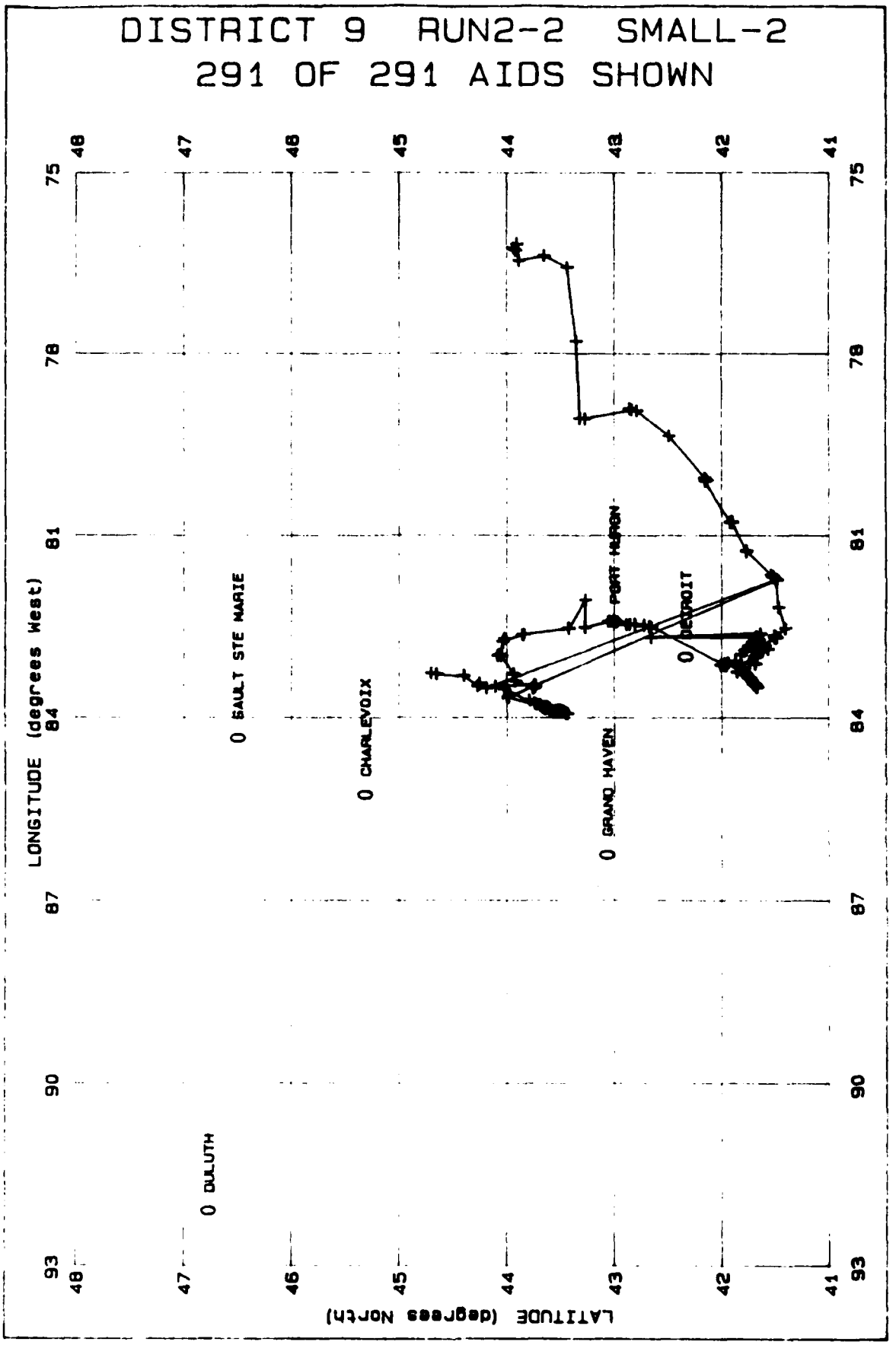

DISTRICT 8 RUN3A-2 BIG-2
151 OF 151 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
MOBILE
NEW ORLEANS
GALVESTON
32
30
28
26
83
86
89
92
95
98

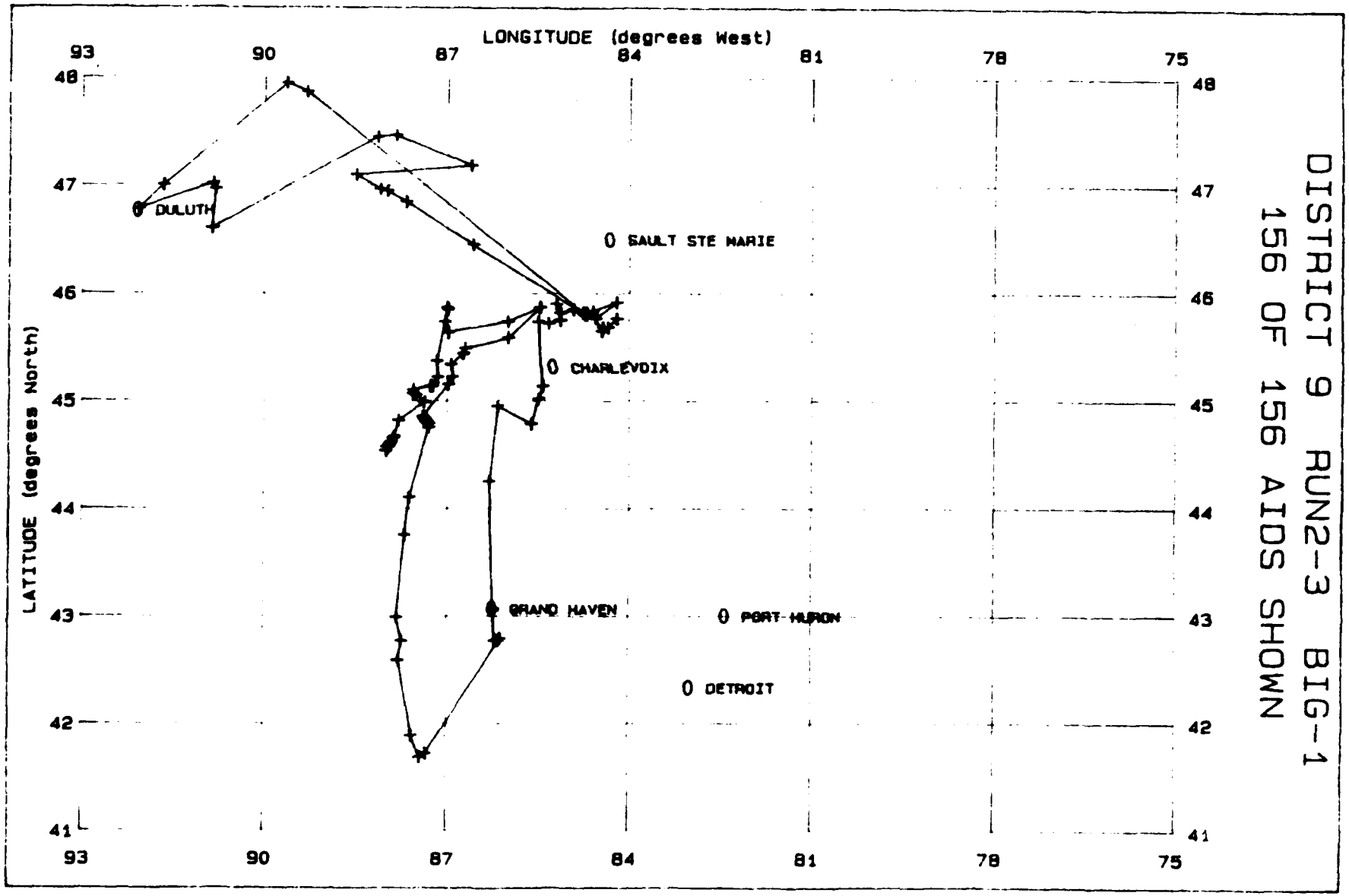
DISTRICT 8 RUN3A-2 BIG-3
58 OF 58 AIDS SHOWN
32
30
28
26
83
86
89
92
95
98
LONGITUDE (degrees West)
LATITUDE (degrees North)
NEW ORLEANS

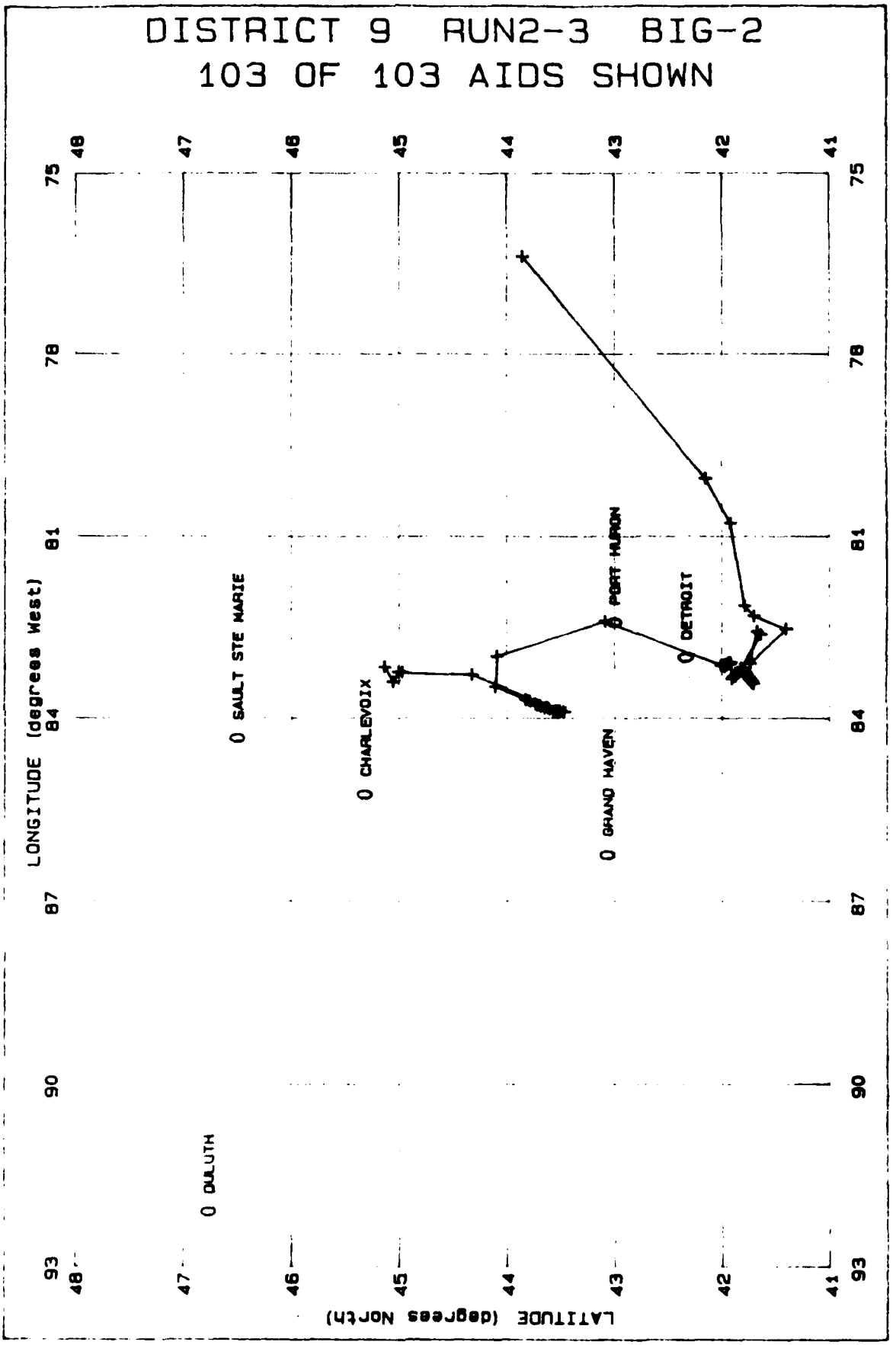

DISTRICT 9 RUN1-1 BIG-1
258 OF 258 AIDS SHOWN
LATITUDE (degrees North)
LONGITUDE (degrees West)
48
47
46
45
44
43
42
41
75
78
81
84
87
90
93
SAULT STE MARIE
CHARLEVOIX
PORT HURON
DETROIT
GRAND HAVEN
DULUTH

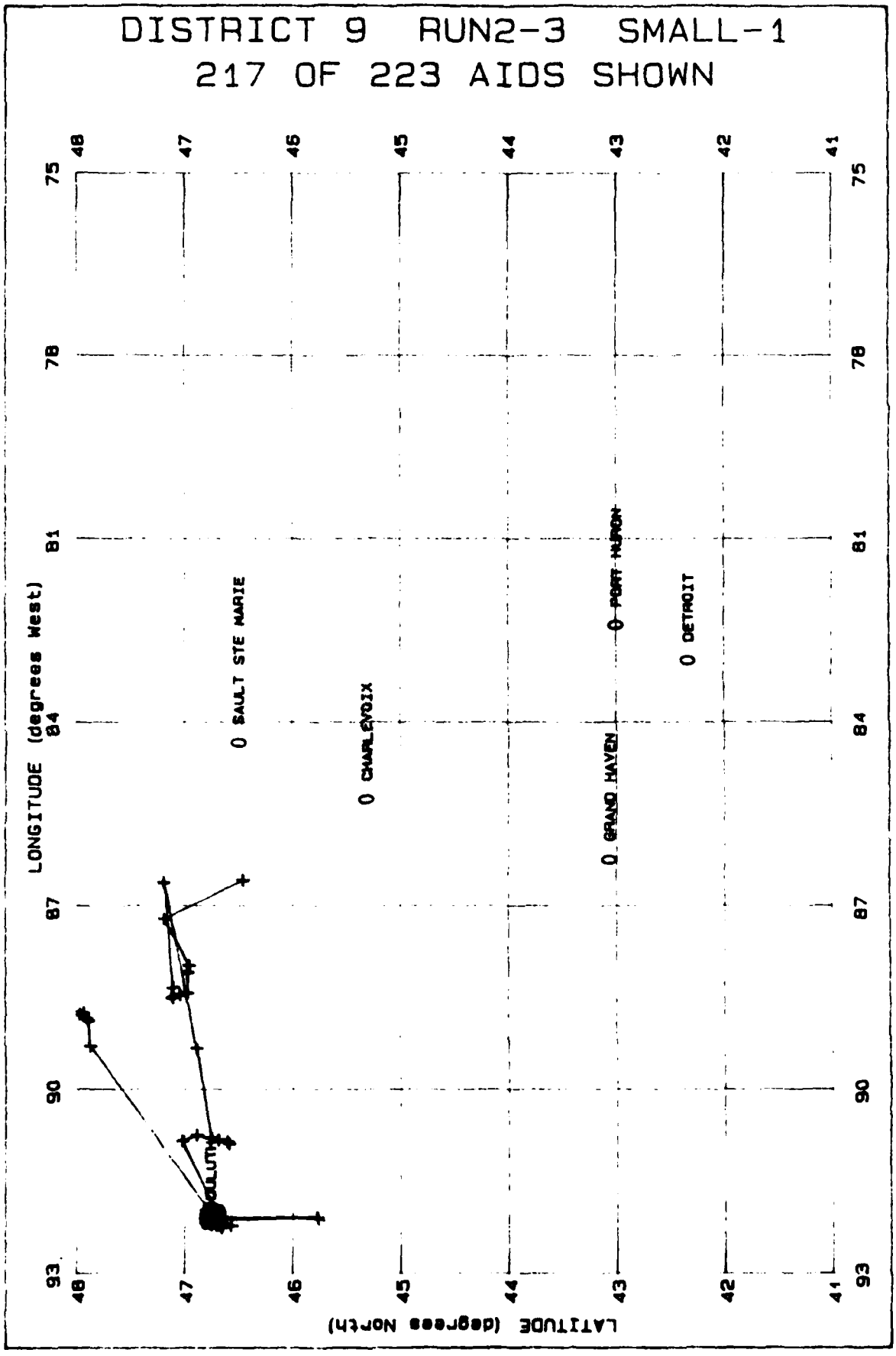

DISTRICT 9 RUN1-1 SMALL-1
681 OF 687 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAULT STE MARIE
CHARLEVOIX
PORT HURON
DETROIT
GRAND HAVEN
DULUTH

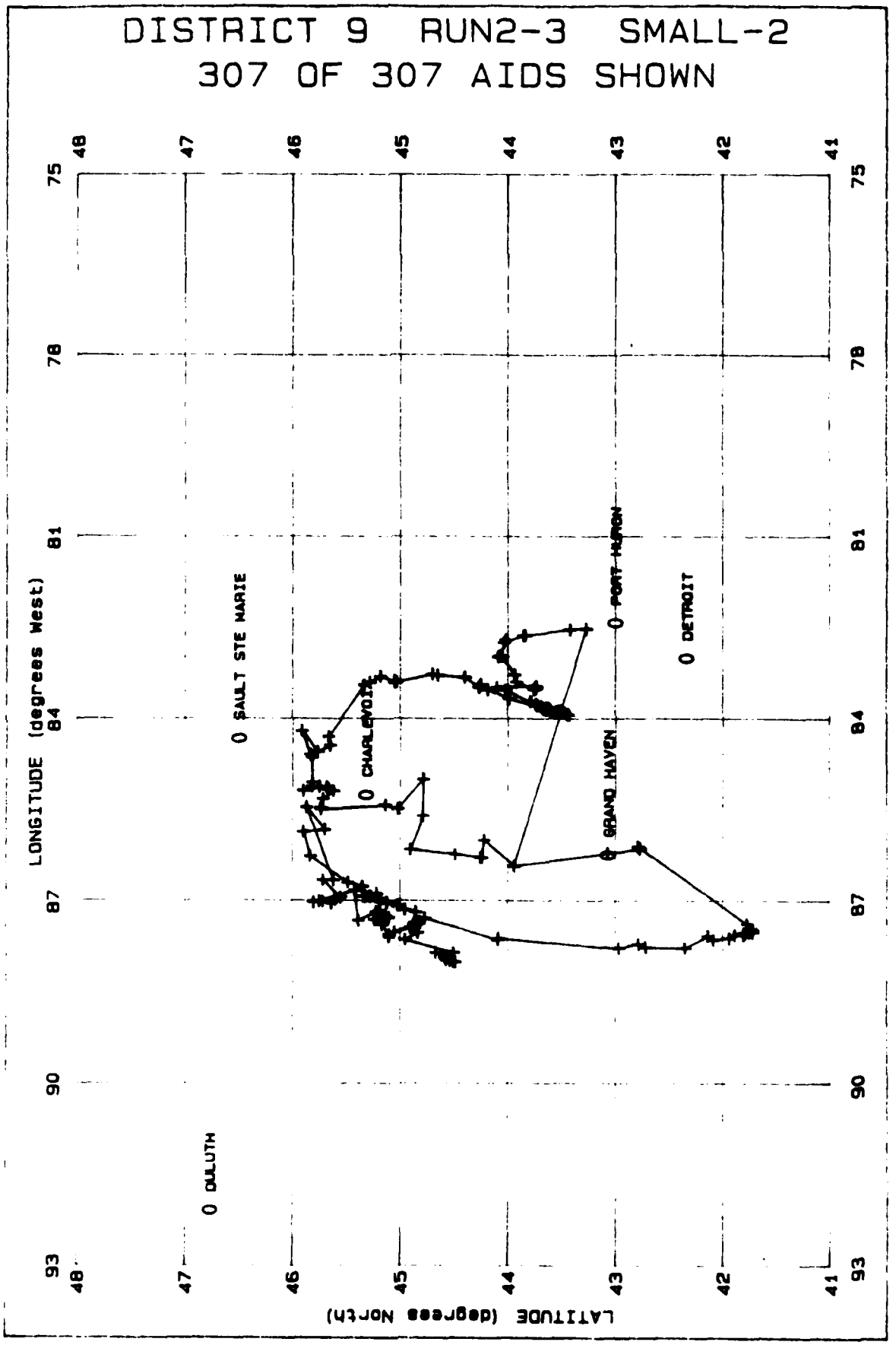

DISTRICT 9 RUN2-2 SMALL-1
389 OF 395 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAULT STE MARIE
CHARLEVOIX
PORT HURON
DETROIT
GRAND HAVEN
48
47
46
45
44
43
42
41
75
78
81
84
87
90
93

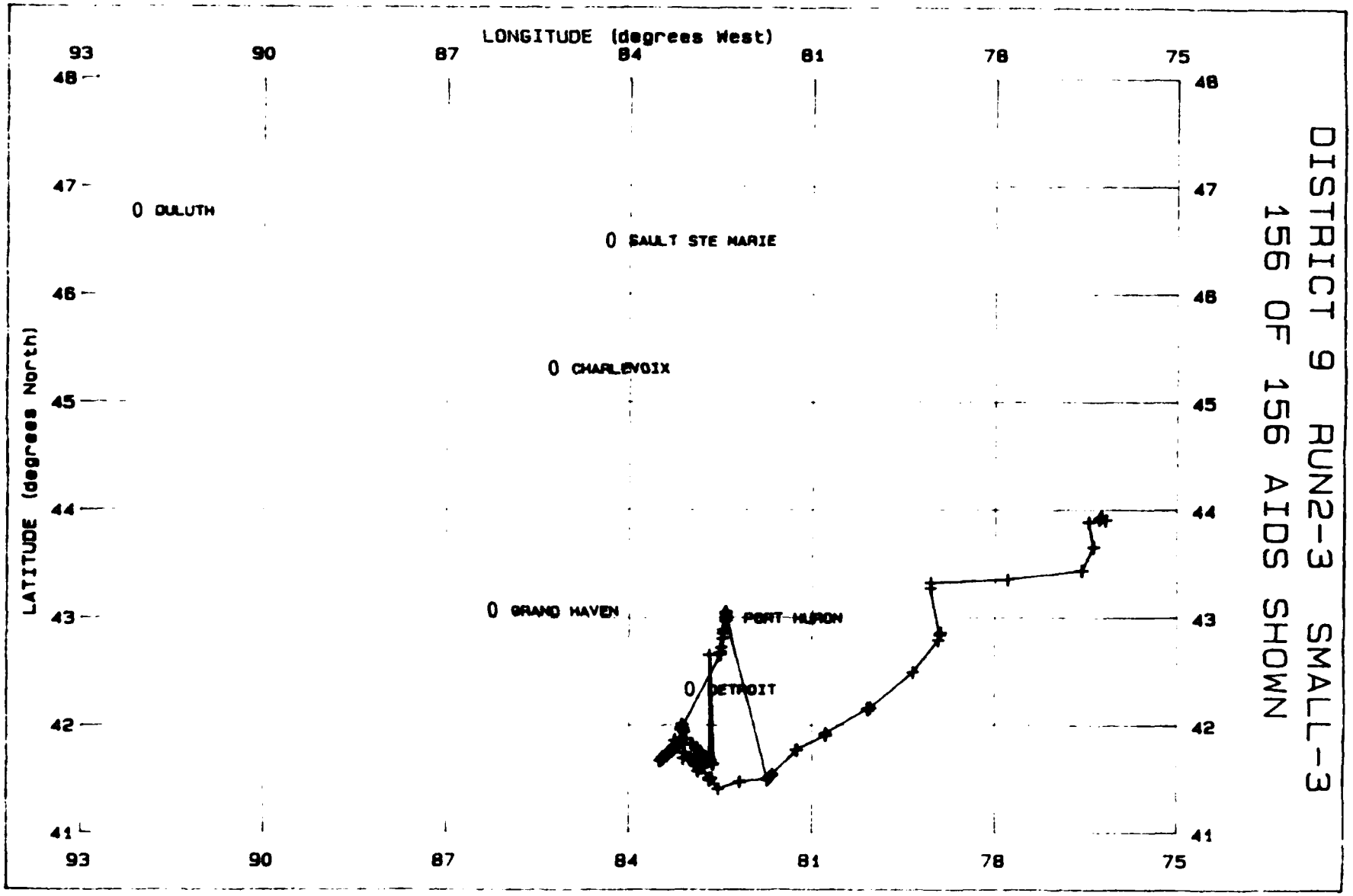

DISTRICT 9 RUN2-2 SMALL-2
291 OF 291 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
0 DULUTH
0 SAULT STE MARIE
0 CHARLEVOIX
0 GRAND HAVEN
PORT HURON
0 DETROIT

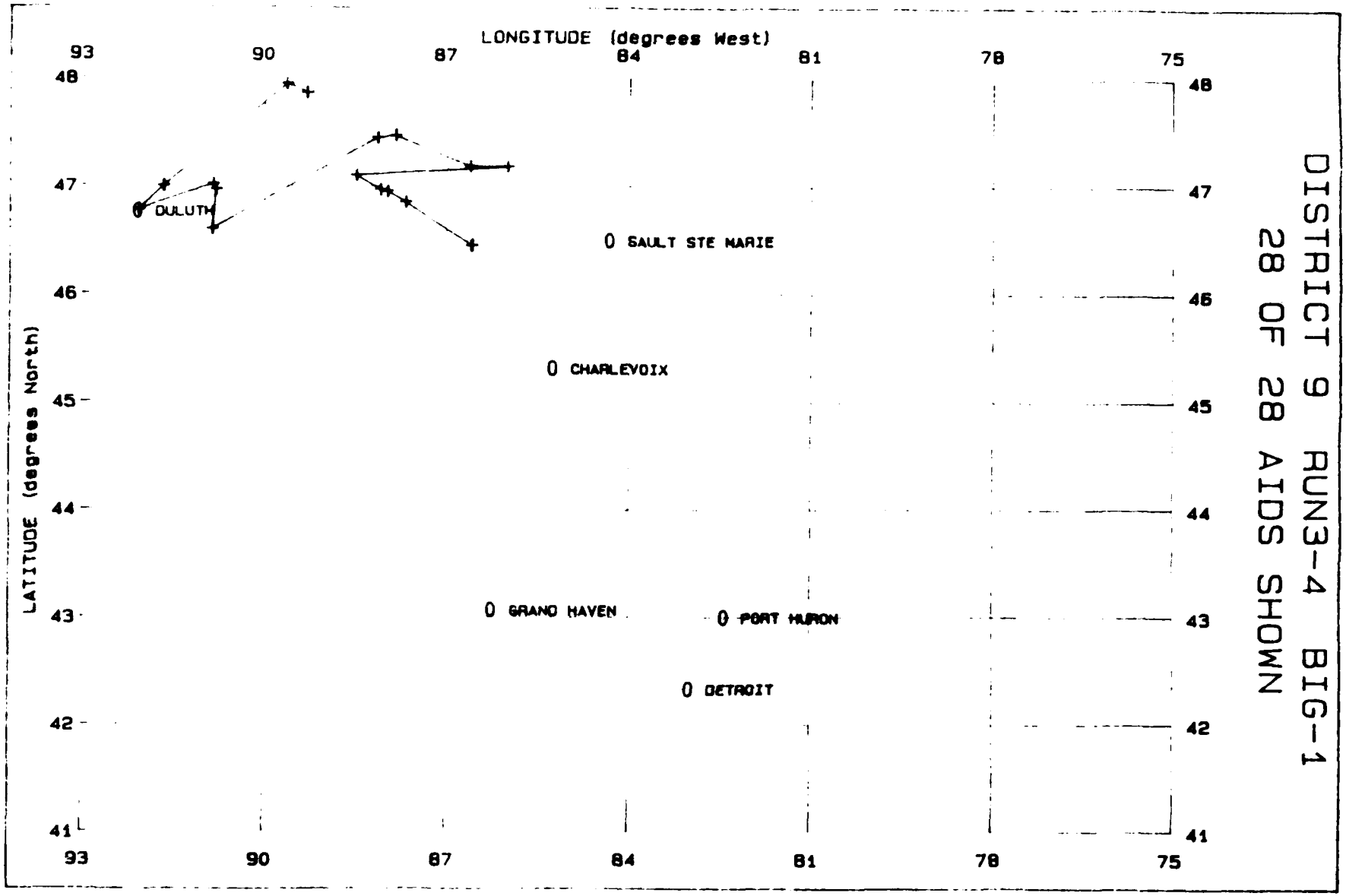

DISTRICT 9 RUN2-3 BIG-1
156 OF 156 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
93
90
87
84
81
78
75
48
47
46
45
44
43
42
41
DULUTH
SAULT STE MARIE
CHARLEVOIX
GRAND HAVEN
PORT HURON
DETROIT

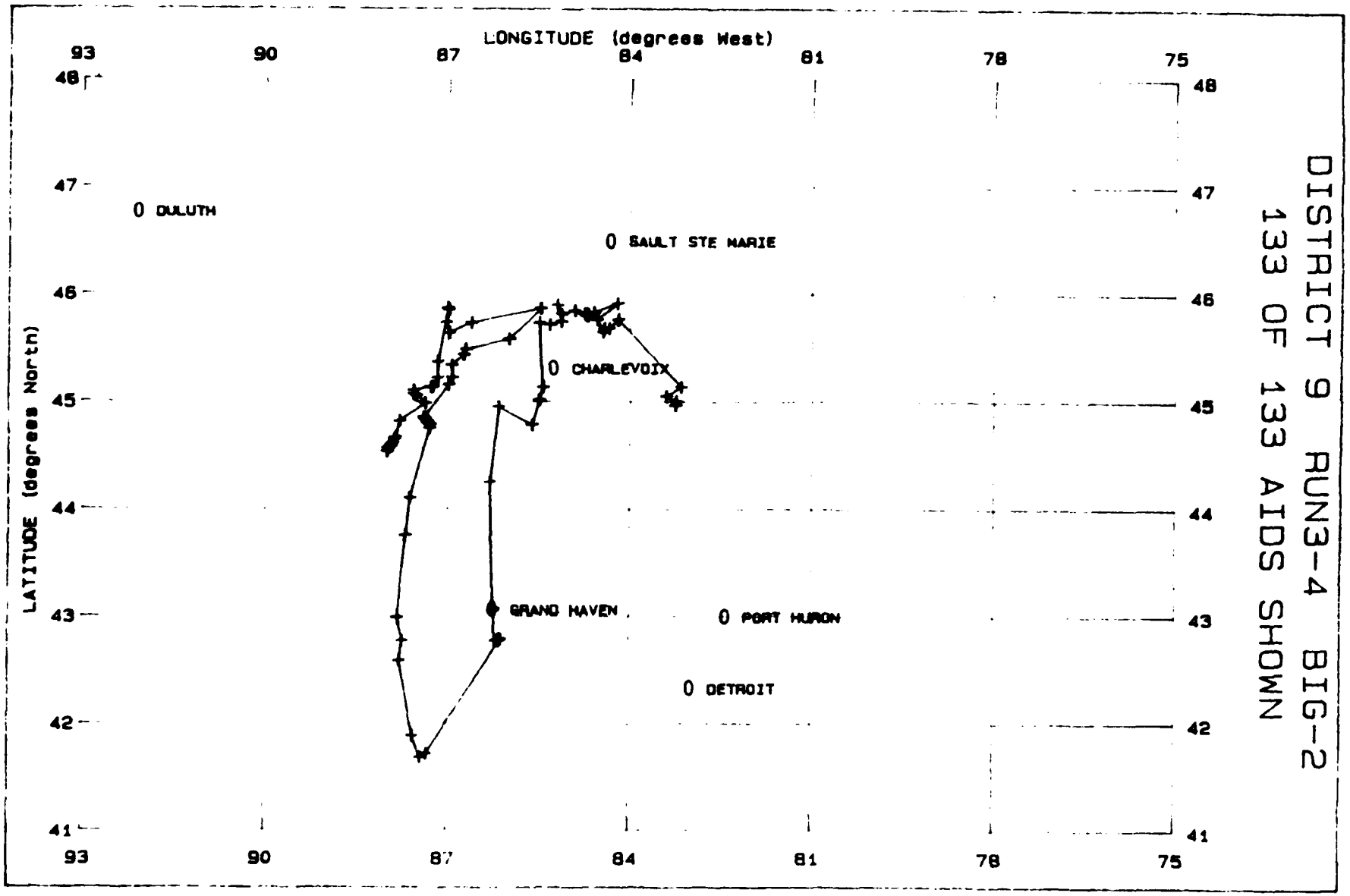

DISTRICT 9 RUN2-3 BIG-2
103 OF 103 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAULT STE MARIE
CHARLEVOIX
PORT HURON
DETROIT
GRAND HAVEN
DULUTH


DISTRICT 9 RUN2-3 SMALL-1
217 OF 223 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
0 SAULT STE MARIE
0 CHARLEVOIX
0 GRAND HAVEN
0 PORT HURON
0 DETROIT

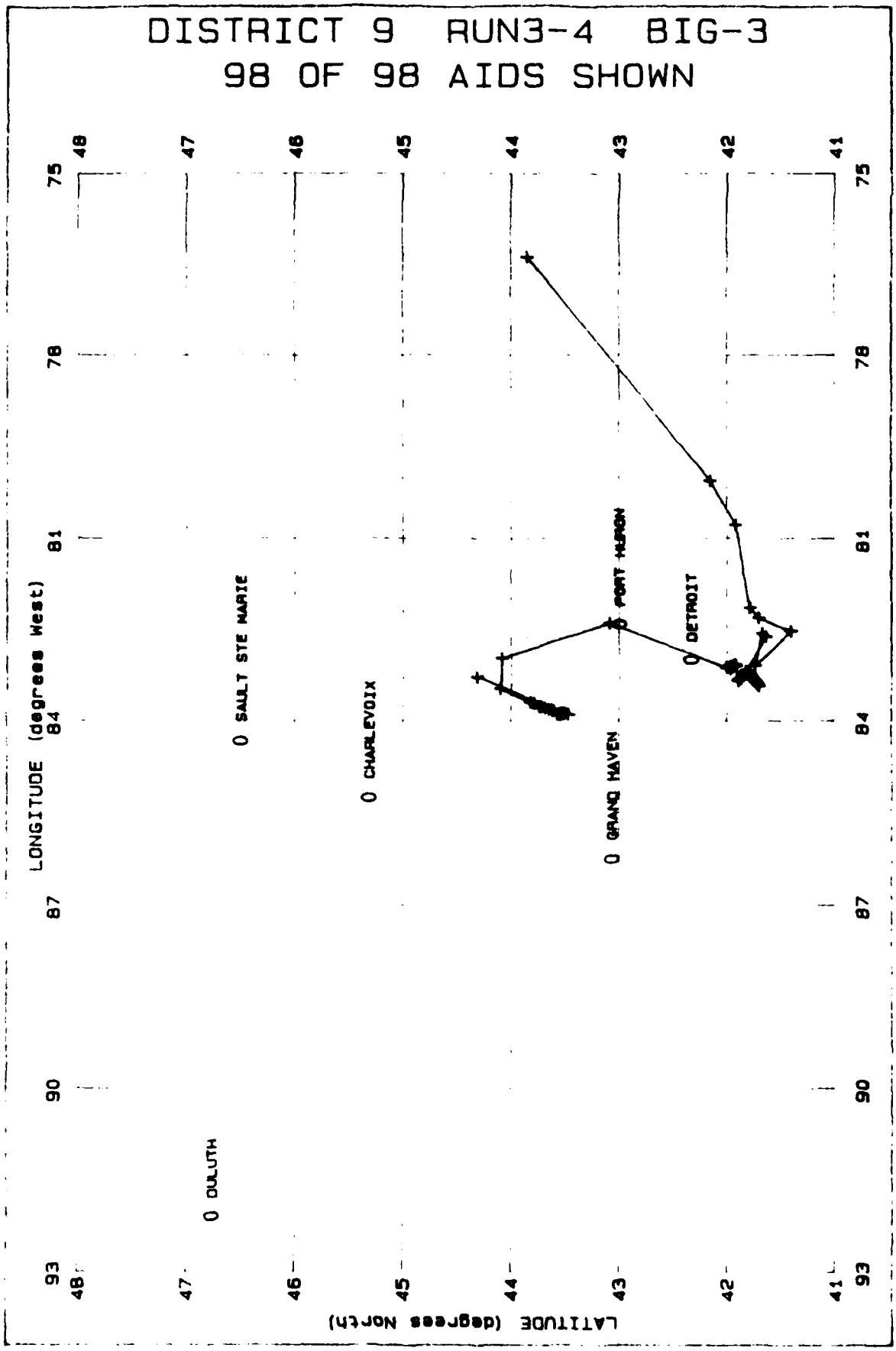

DISTRICT 9 RUN2-3 SMALL-2
307 OF 307 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
0 SAULT STE MARIE
0 CHARLEVOIX
0 PORT HURON
0 DETROIT
GRAND HAVEN
0 DULUTH

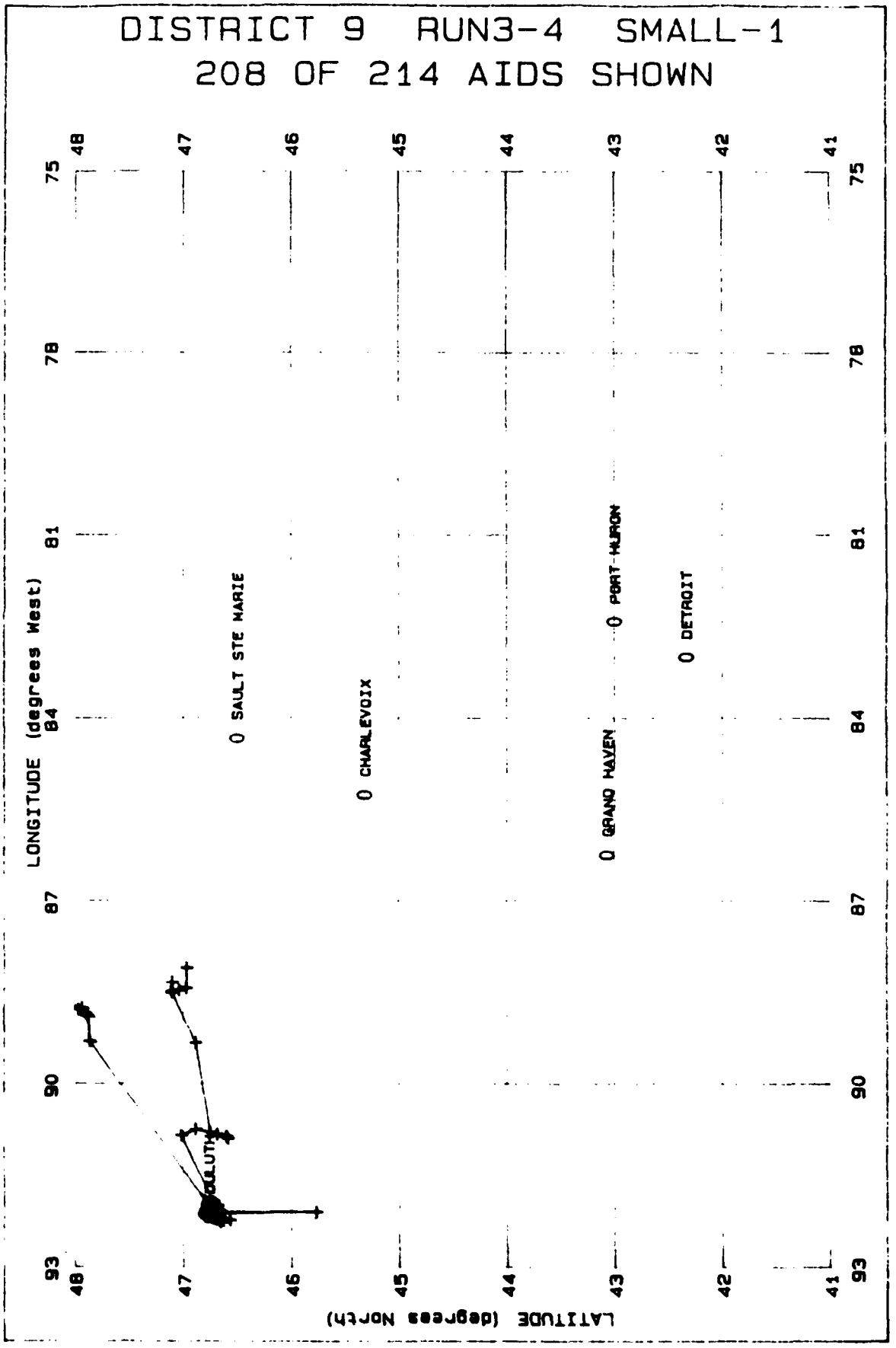

DISTRICT 9 RUN2-3 SMALL-3
156 OF 156 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
93
90
87
84
81
78
75
48
47
46
45
44
43
42
41
0 DULUTH
0 SAULT STE MARIE
0 CHARLEVOIX
0 GRAND HAVEN
PORT HURON
0 DETROIT

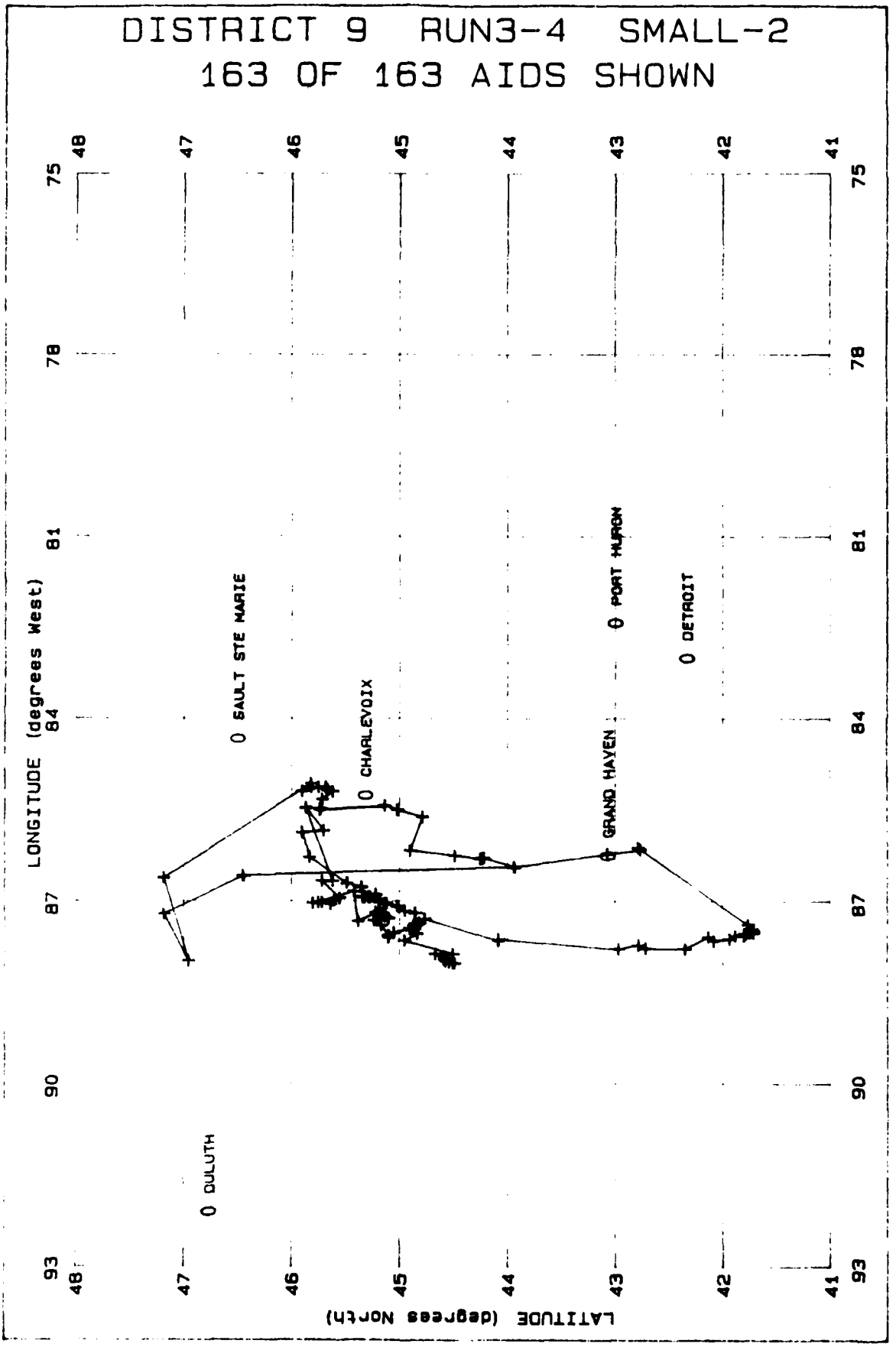

DISTRICT 9 RUN3-4 BIG-1
28 OF 28 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
93
90
87
84
81
78
75
48
47
46
45
44
43
42
41
DULUTH
SAULT STE MARIE
CHARLEVOIX
GRAND HAVEN
PORT HURON
DETROIT

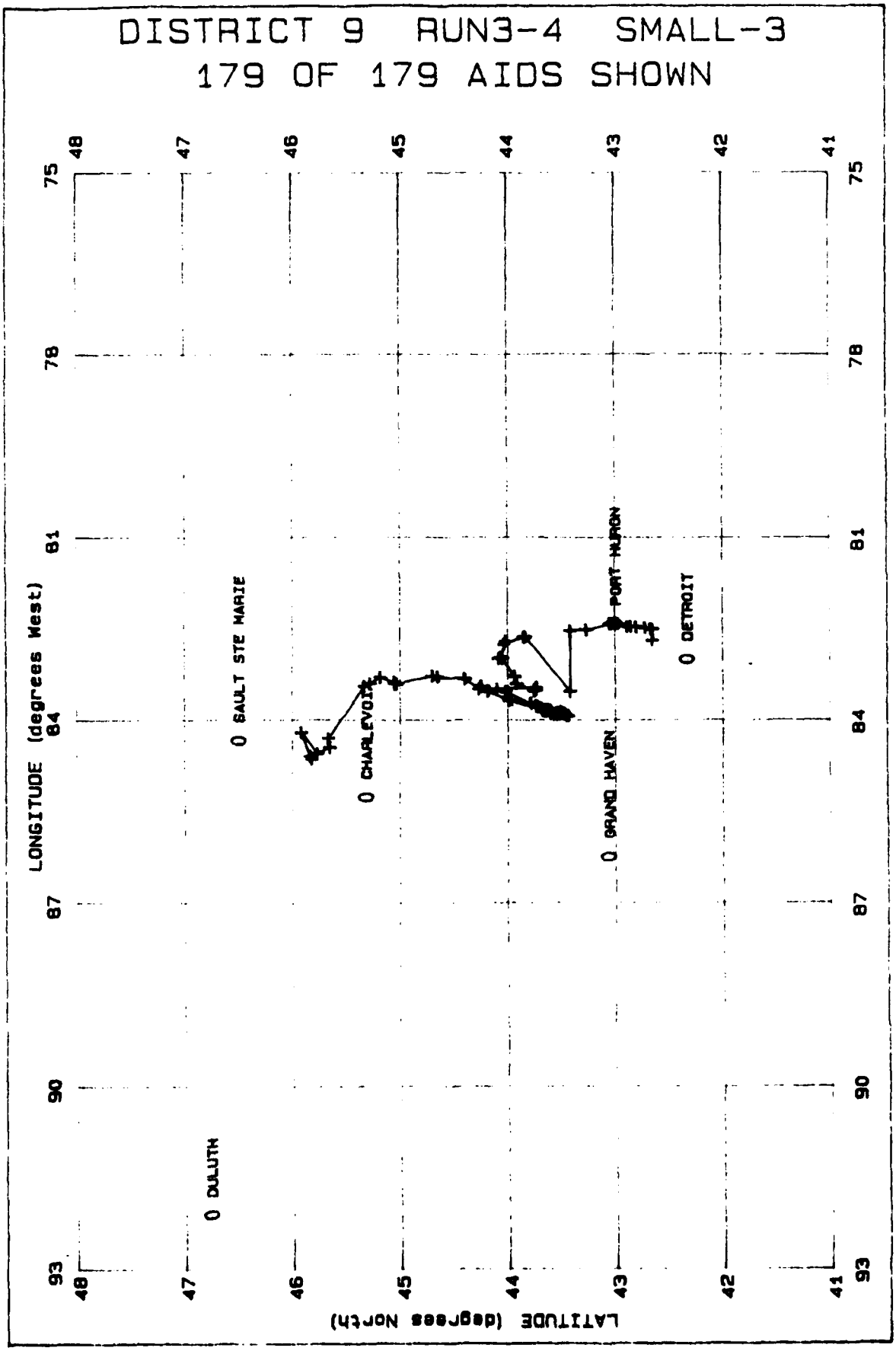


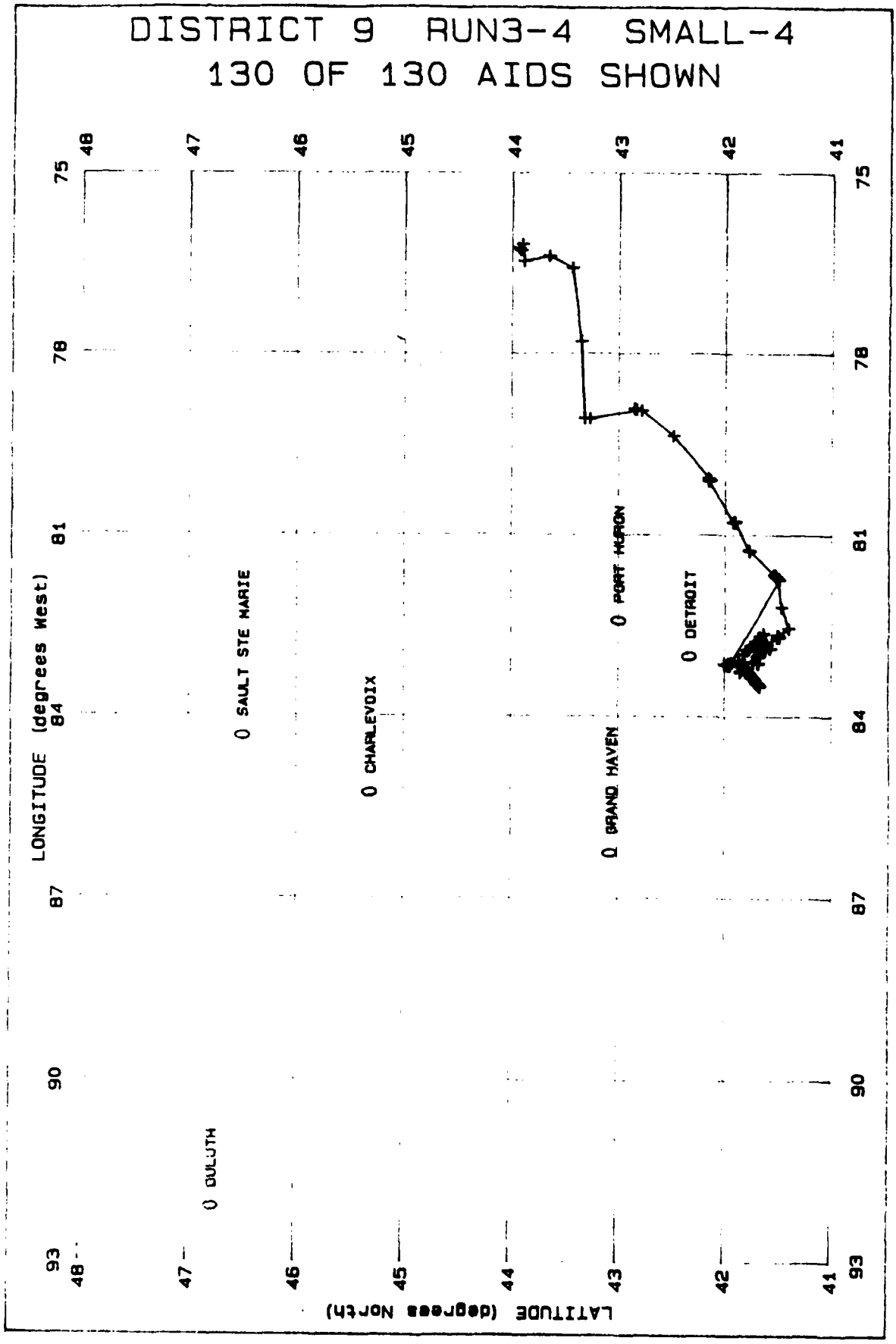
DISTRICT 9 RUN3-4 BIG-2
133 OF 133 AIDS SHOWN

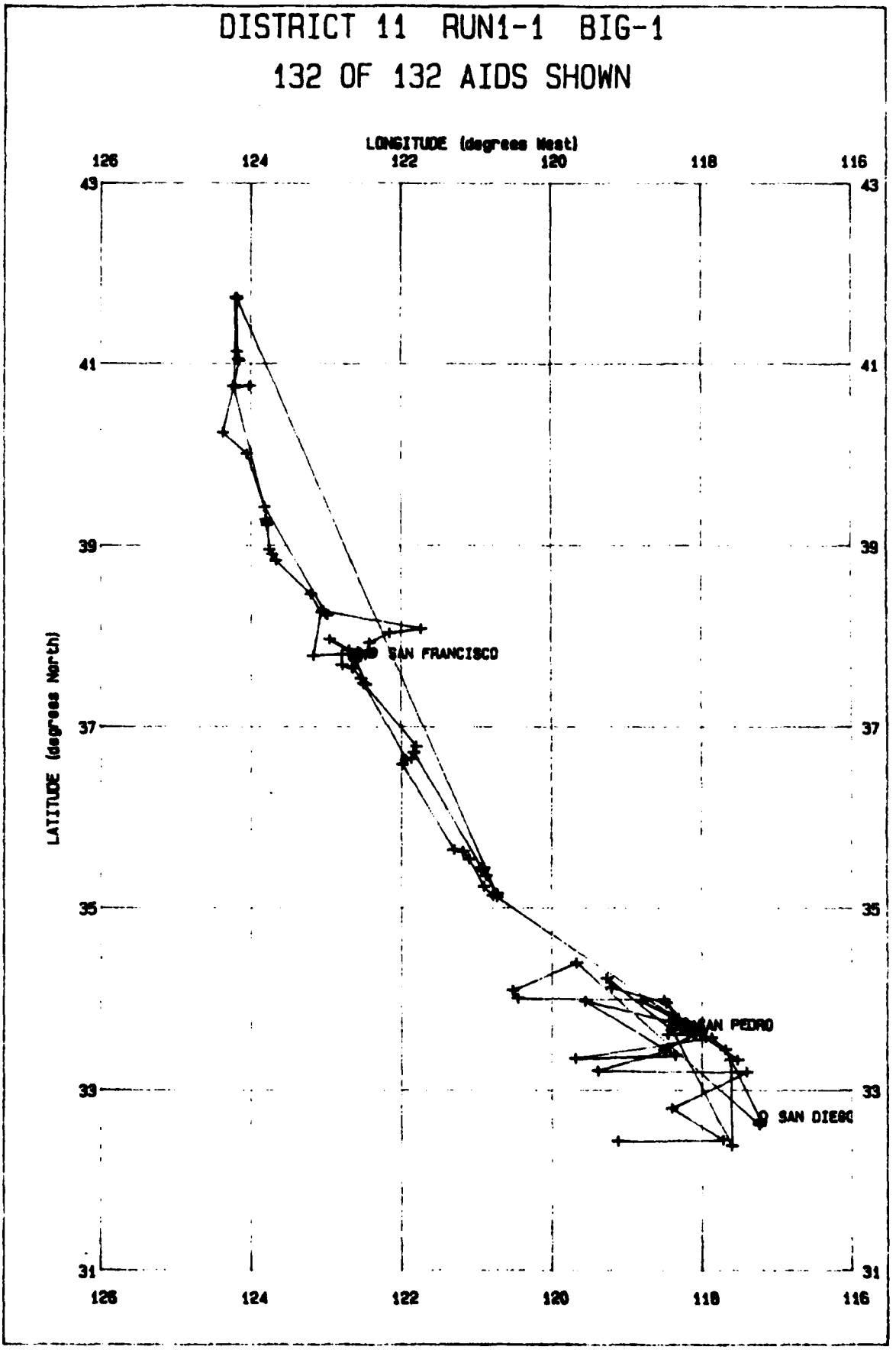

DISTRICT 9 RUN3-4 BIG-3
98 OF 98 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAULT STE MARIE
CHARLEVOIX
PORT HURON
DETROIT
GRAND HAVEN
DULUTH

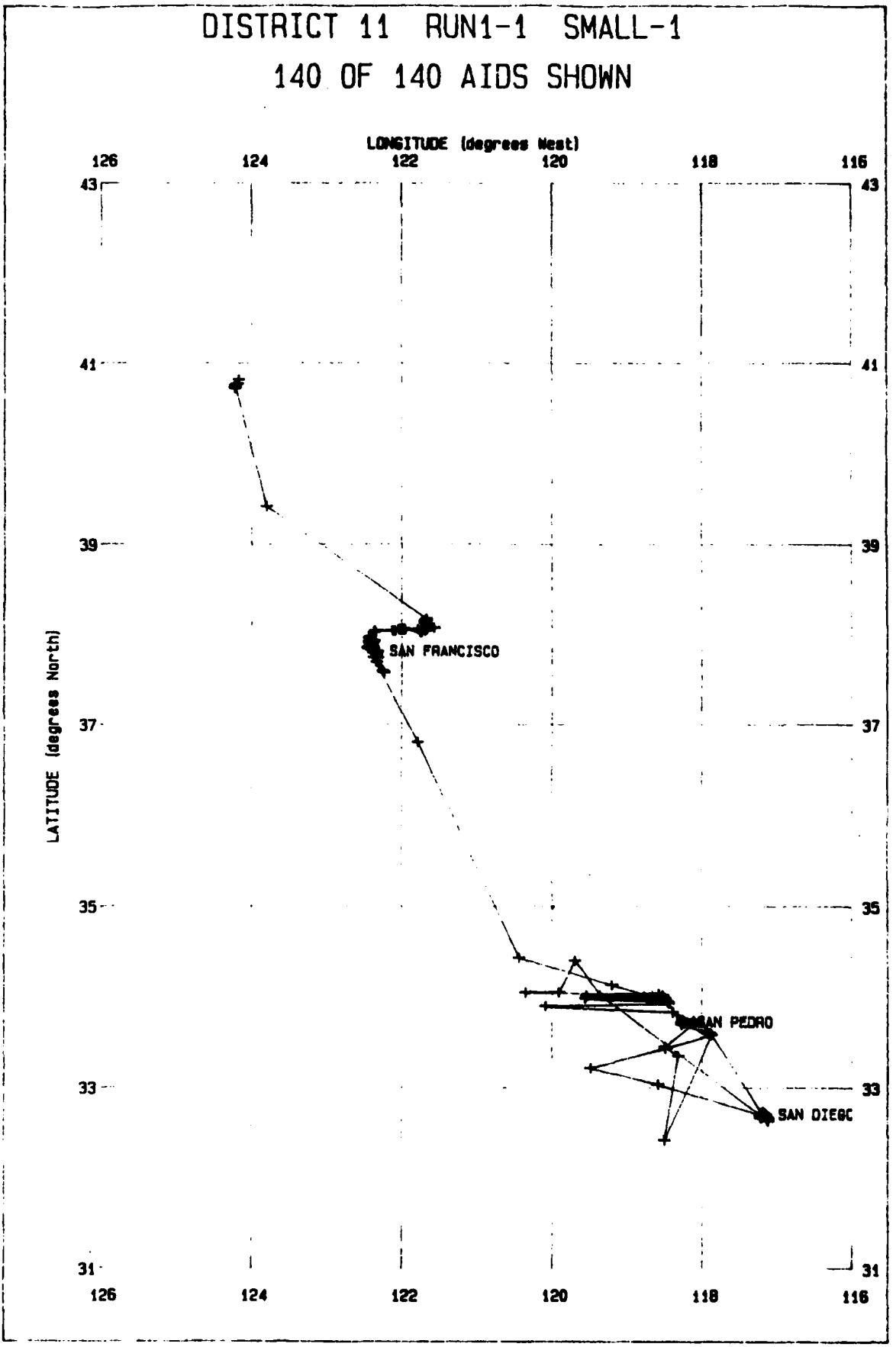

DISTRICT 9 RUN3-4 SMALL-1
208 OF 214 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAULT STE MARIE
CHARLEVOIX
GRAND HAVEN
PORT HURON
DETROIT
SOLUTION

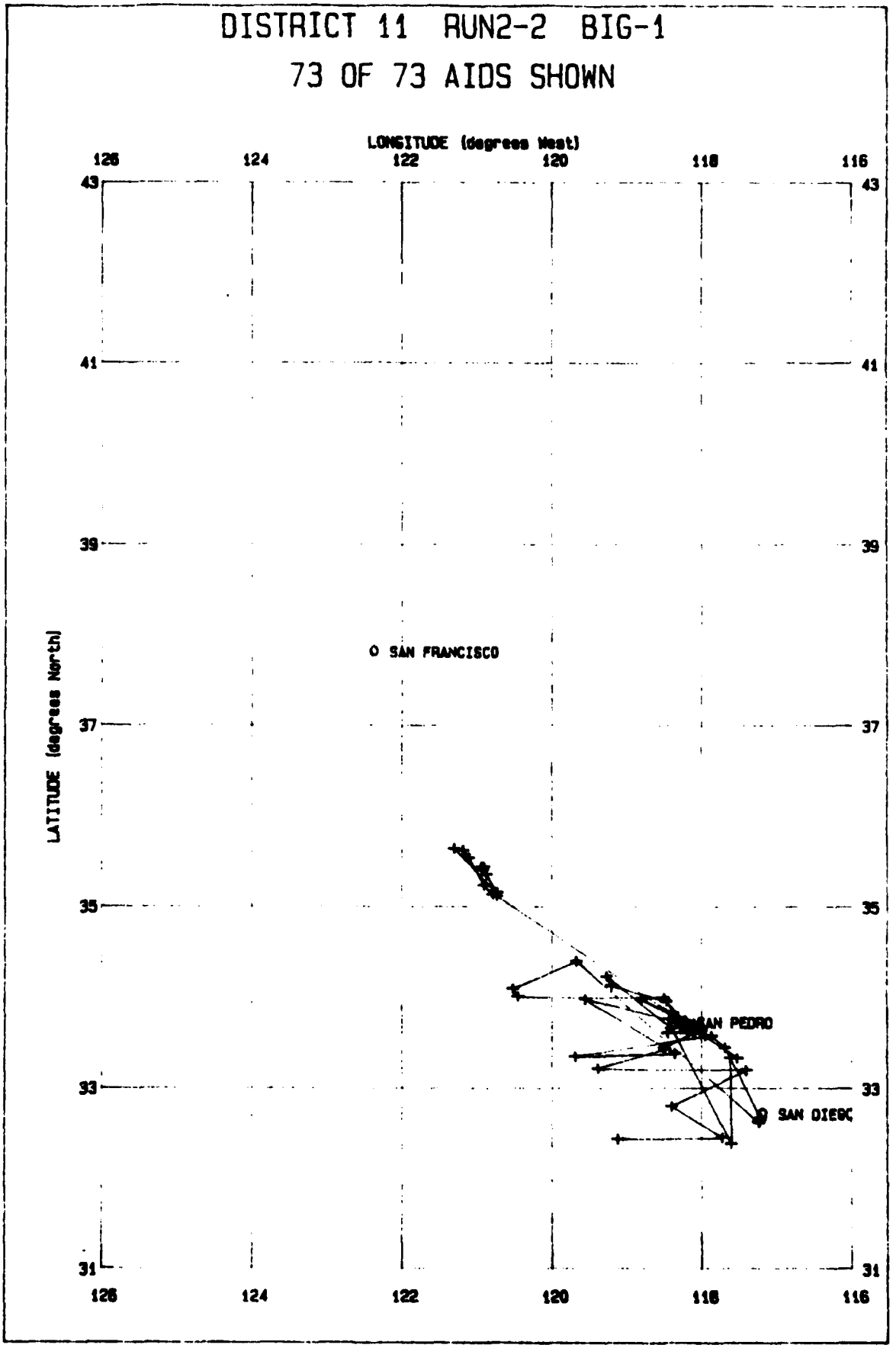

DISTRICT 9 RUN3-4 SMALL-2
163 OF 163 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAULT STE MARIE
CHARLEVOIX
GRAND HAVEN
PORT HURON
DETROIT
DULUTH

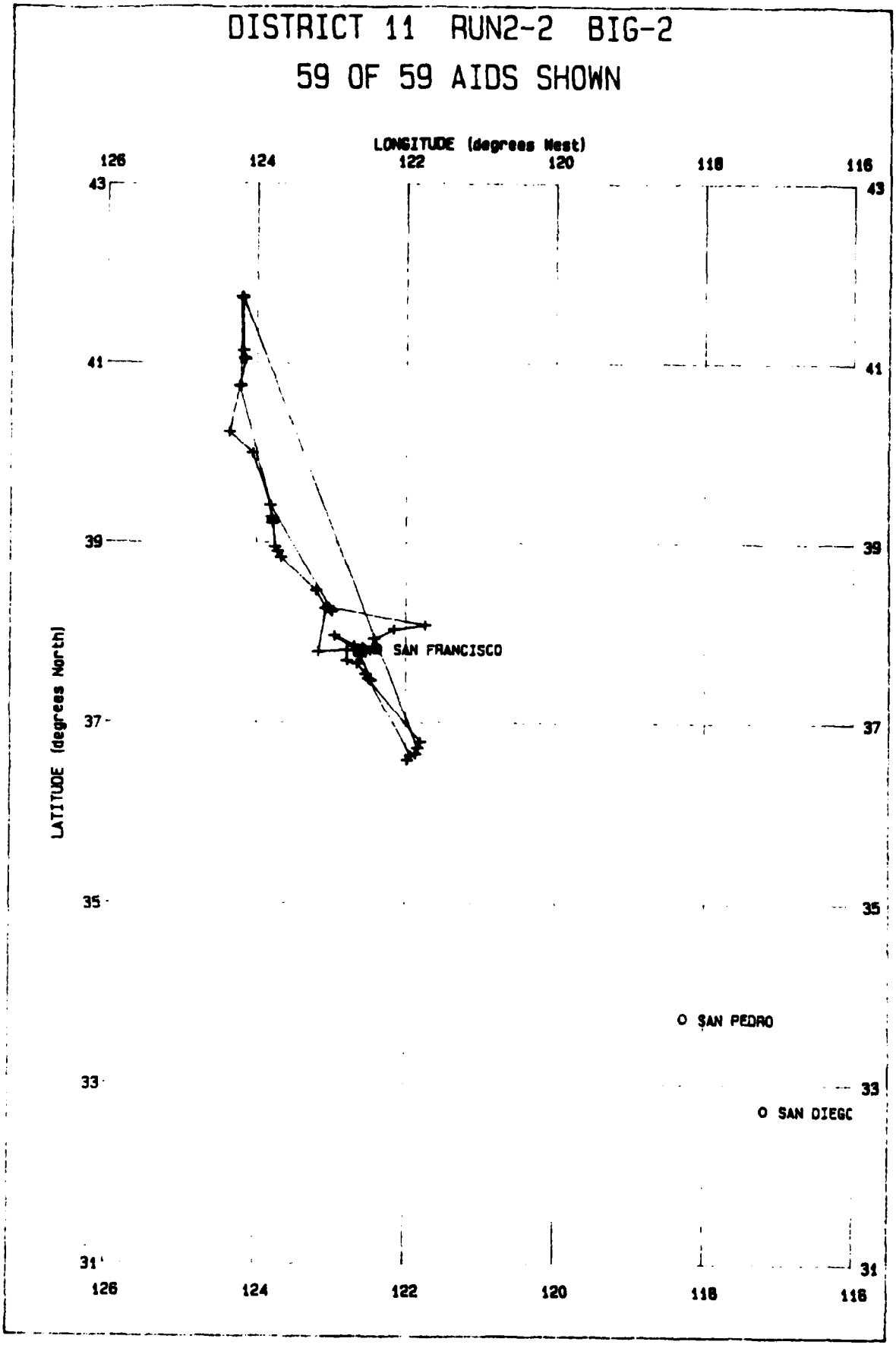

DISTRICT 9 RUN3-4 SMALL-3
179 OF 179 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
0 SAULT STE MARIE
0 CHARLEVOIX
0 GRAND HAVEN
PORT HURON
0 DETROIT
0 DULUTH

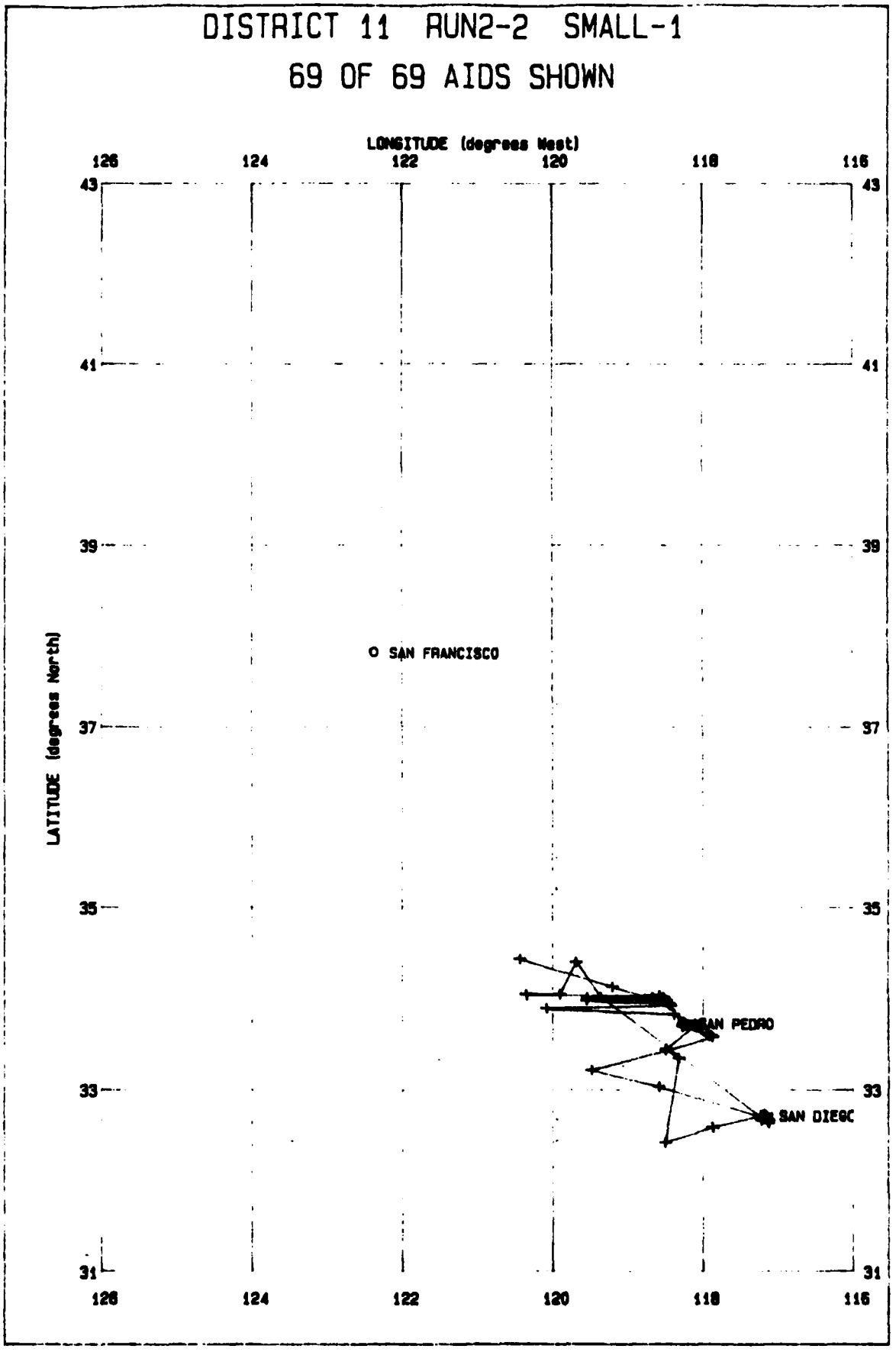

DISTRICT 9 RUN3-4 SMALL-4
130 OF 130 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
SAULT STE MARIE
CHARLEVOIX
GRAND HAVEN
PORT HURON
DETROIT
DULUTH

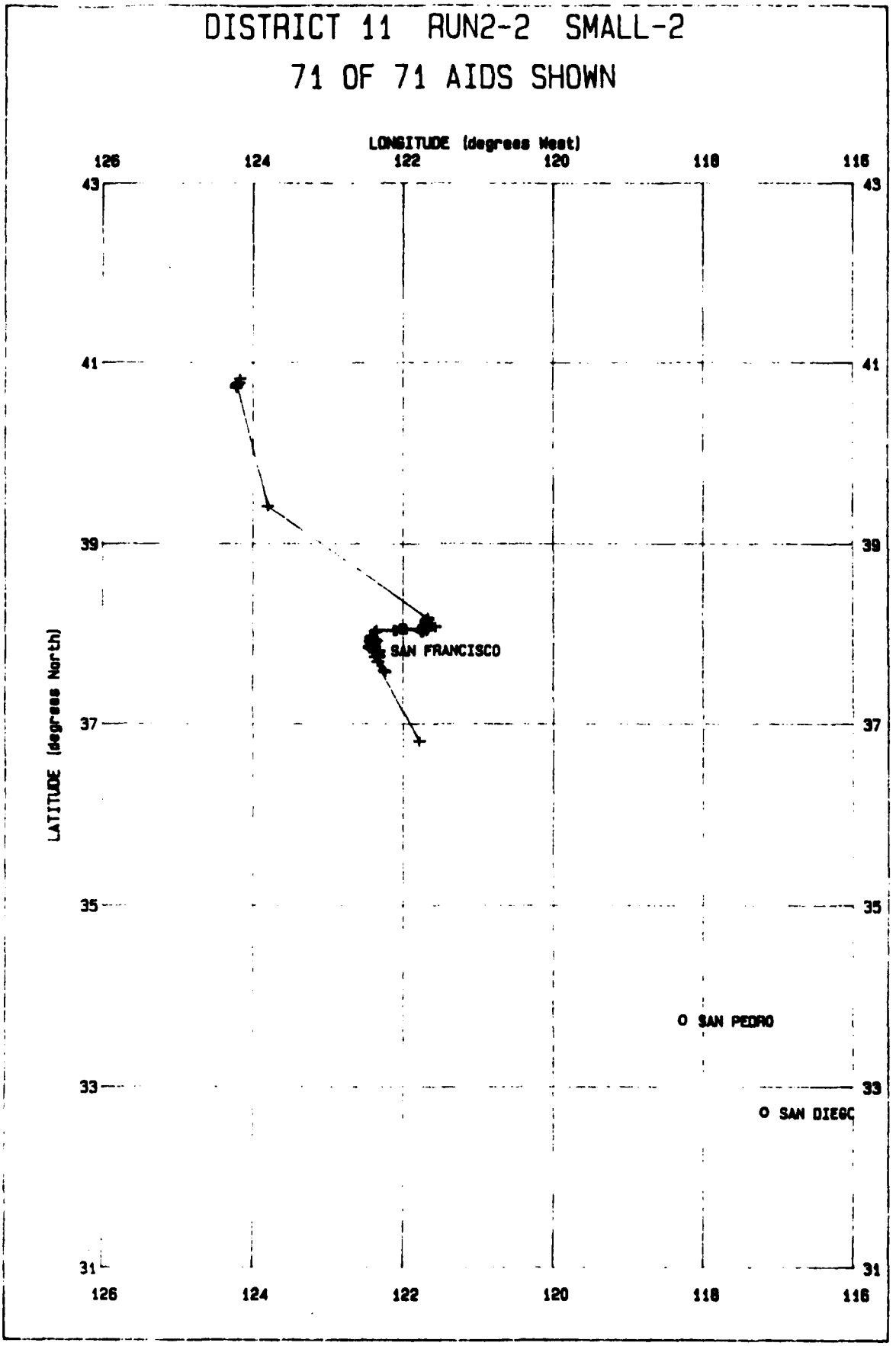

DISTRICT 11 RUN1-1 BIG-1
132 OF 132 AIDS SHOWN
LONGITUDE (degrees West)
126
124
122
120
118
116
43
41
39
37
35
33
31
LATITUDE (degrees North)
SAN FRANCISCO
SAN PEDRO
SAN DIEGO

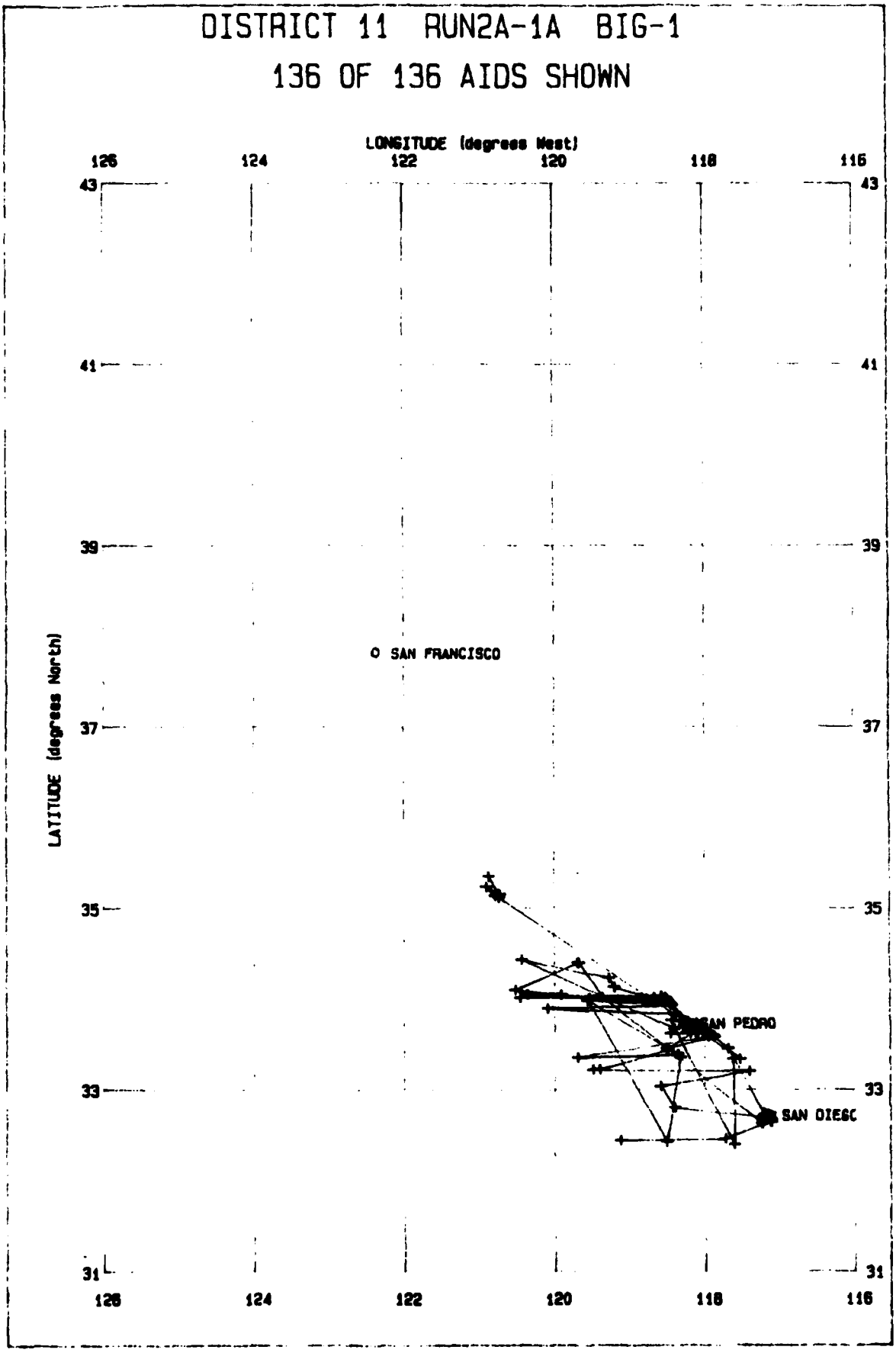

DISTRICT 11 RUN1-1 SMALL-1
140 OF 140 AIDS SHOWN
LONGITUDE (degrees West)
126
124
122
120
118
116
43
41
39
37
35
33
31
LATITUDE (degrees North)
SAN FRANCISCO
SAN PEDRO
SAN DIEGO

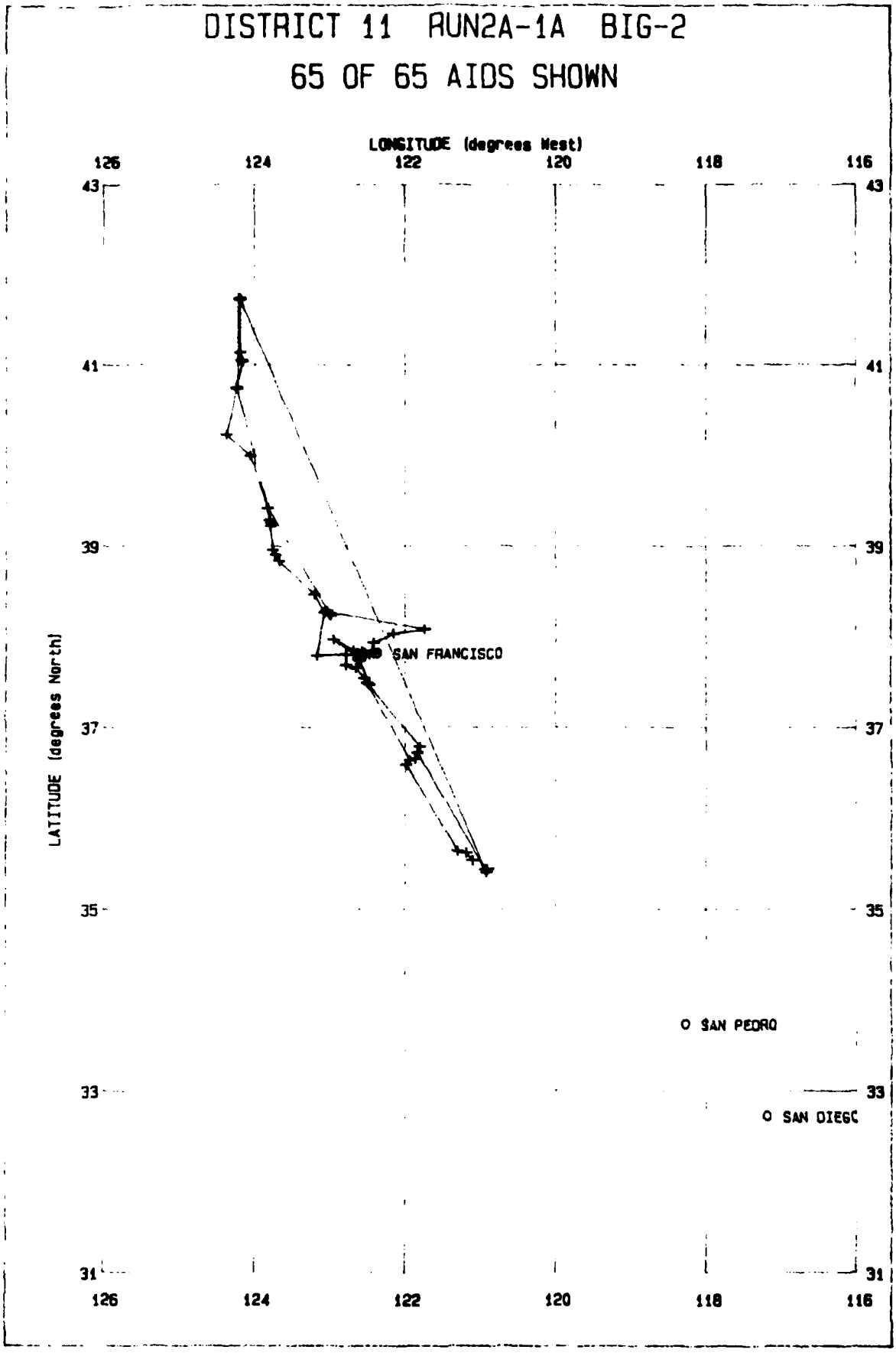

DISTRICT 11 RUN2-2 BIG-1
73 OF 73 AIDS SHOWN
LONGITUDE (degrees West)
126
124
122
120
118
116
43
41
39
37
35
33
31
LATITUDE (degrees North)
SAN FRANCISCO
SAN PEDRO
SAN DIEGO

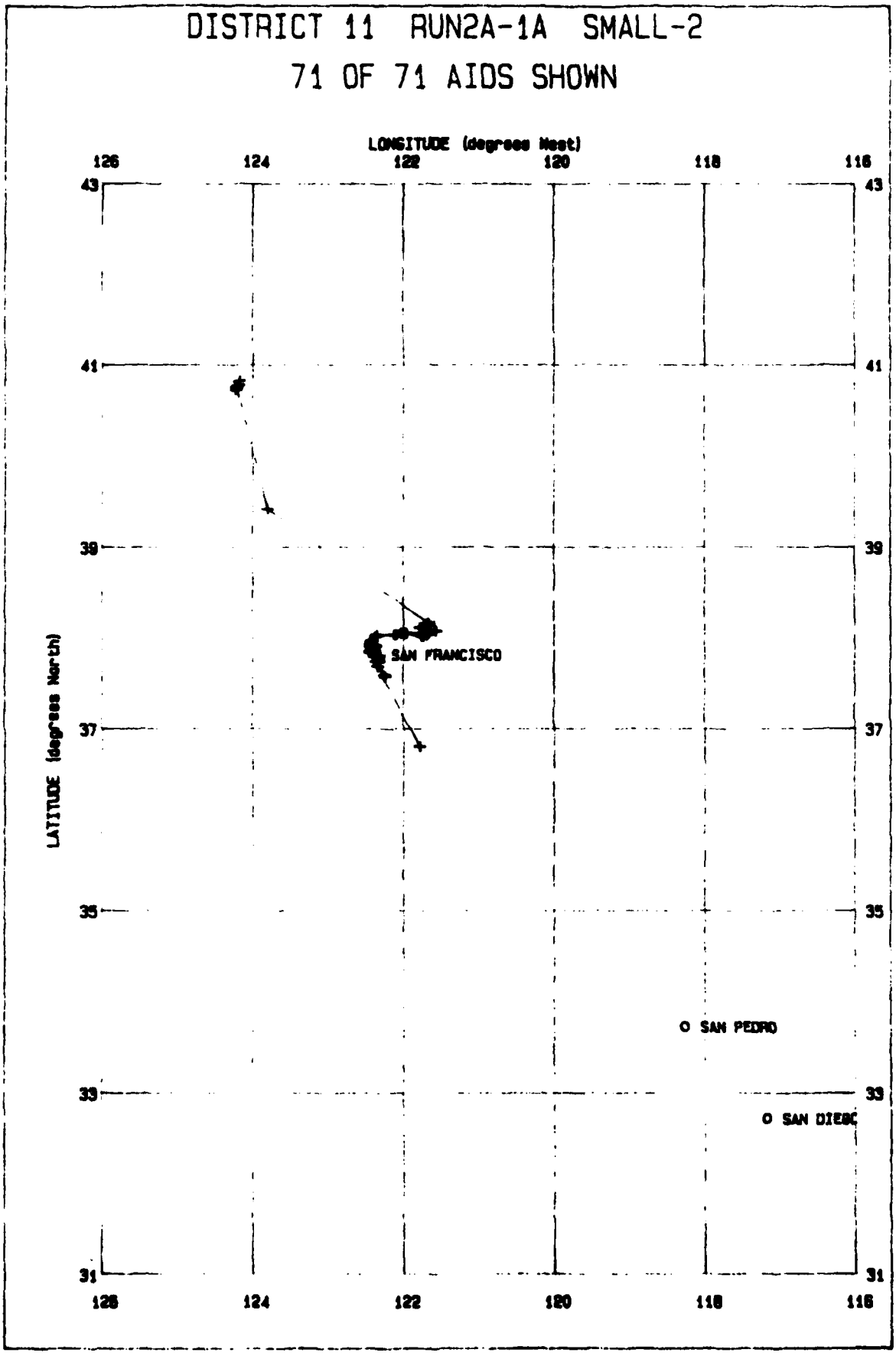

DISTRICT 11 RUN2-2 BIG-2
59 OF 59 AIDS SHOWN
LONGITUDE (degrees West)
126
124
122
120
118
116
43
41
39
37
35
33
31
LATITUDE (degrees North)
SAN FRANCISCO
O SAN PEDRO
O SAN DIEGO

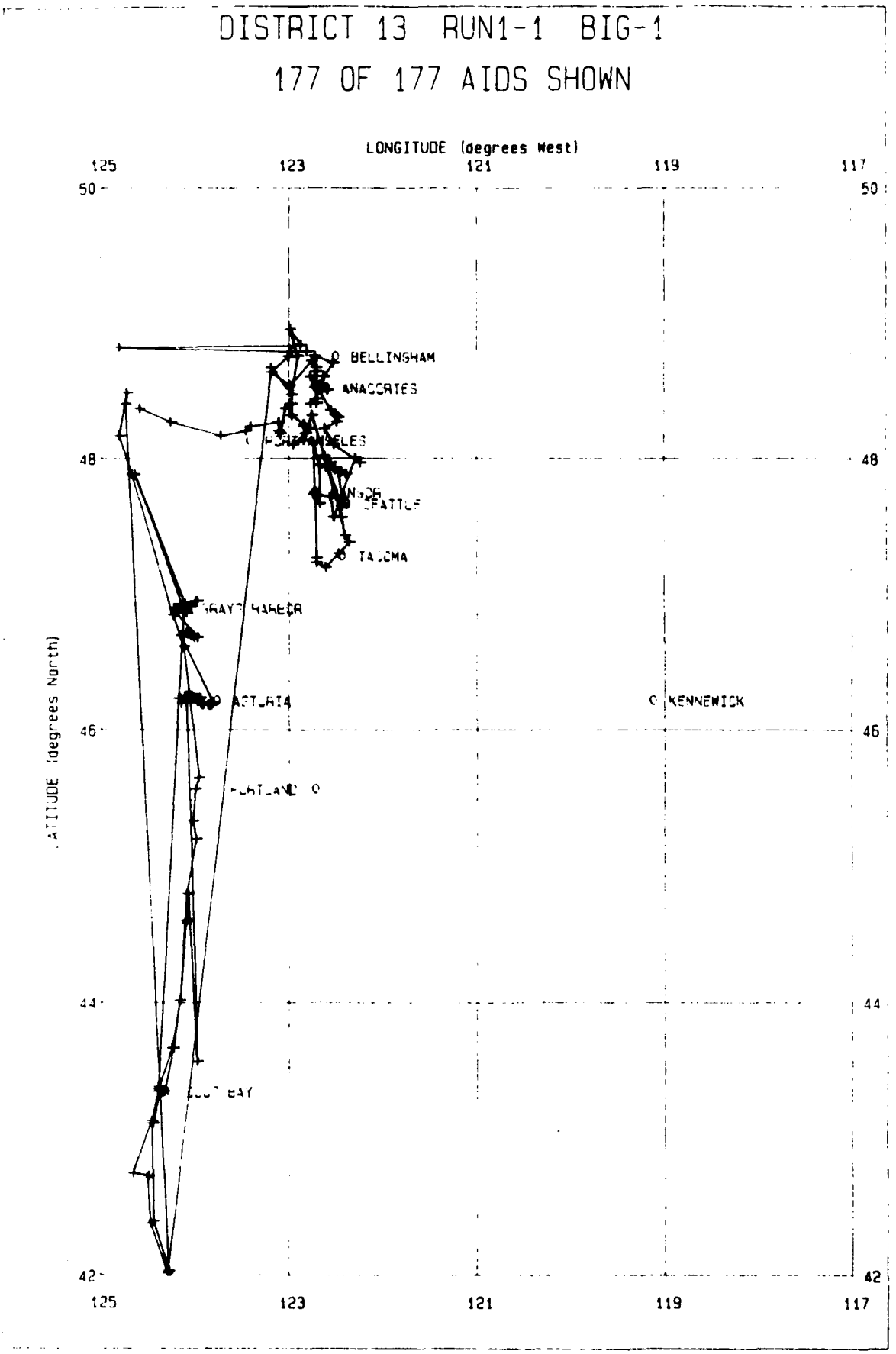

DISTRICT 11 RUN2-2 SMALL-1
69 OF 69 AIDS SHOWN
LONGITUDE (degrees West)
126
124
122
120
118
116
43
41
39
37
35
33
31
LATITUDE (degrees North)
SAN FRANCISCO
SAN PEDRO
SAN DIEGO

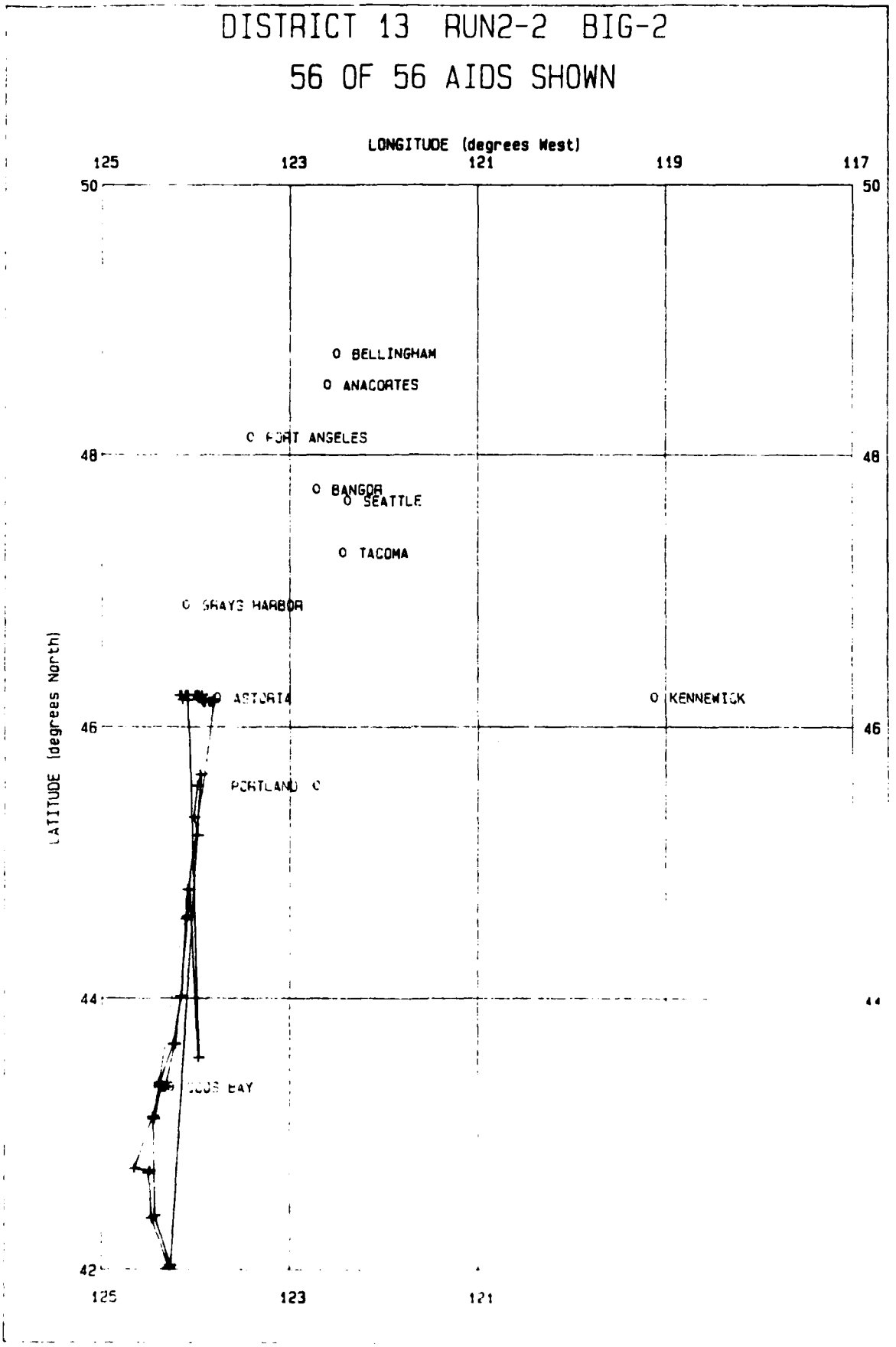

DISTRICT 11 RUN2-2 SMALL-2
71 OF 71 AIDS SHOWN
LONGITUDE (degrees West)
126
124
122
120
118
116
43
41
39
37
35
33
31
LATITUDE (degrees North)
SAN FRANCISCO
SAN PEDRO
SAN DIEGO


DISTRICT 11 RUN2A-1A BIG-1
136 OF 136 AIDS SHOWN
LONGITUDE (degrees West)
126
124
122
120
118
116
43
41
39
37
35
33
31
LATITUDE (degrees North)
SAN FRANCISCO
SAN PEDRO
SAN DIEGO


DISTRICT 11 RUN2A-1A BIG-2
65 OF 65 AIDS SHOWN
LONGITUDE (degrees West)
126
124
122
120
118
116
43
41
39
37
35
33
31
LATITUDE (degrees North)
SAN FRANCISCO
SAN PEDRO
SAN DIEGO

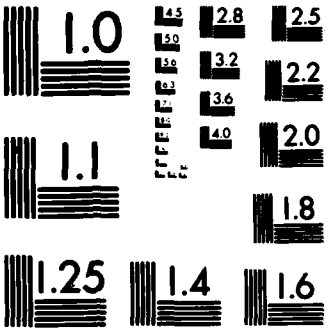

DISTRICT 11 RUN2A-1A SMALL-2
71 OF 71 AIDS SHOWN
LONGITUDE (degrees West)
126
124
122
120
118
116
43
41
39
37
35
33
31
LATITUDE (degrees North)
SAN FRANCISCO
O SAN PEDRO
O SAN DIEG


DISTRICT 13 RUN1-1 BIG-1
177 OF 177 AIDS SHOWN
LONGITUDE (degrees West)
125
123
121
119
117
50
48
46
44
42
BELLINGHAM
ANACORTES
SEATTLE
TACOMA
KENNEWICK
ASTORIA
ATITUDE (degrees North)

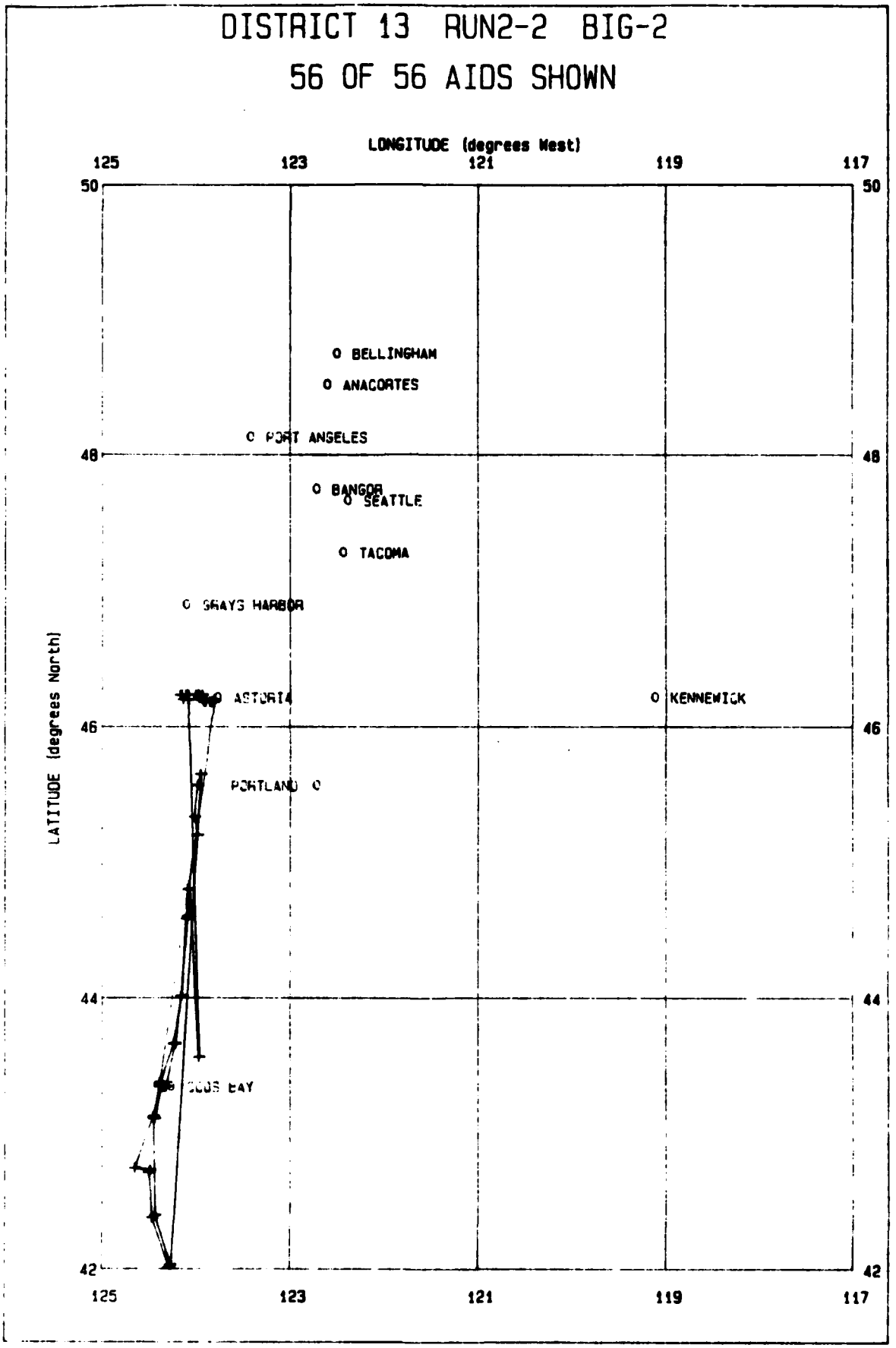

DISTRICT 13 RUN2-2 BIG-2
56 OF 56 AIDS SHOWN
LONGITUDE (degrees West)
125
123
121
119
117
50
48
46
44
42
LATITUDE (degrees North)
BELLINGHAM
ANACORTES
PORT ANGELES
BANGOR
SEATTLE
TACOMA
GRAYS HARBOR
ASTORIA
KENNEWICK
PORTLAND

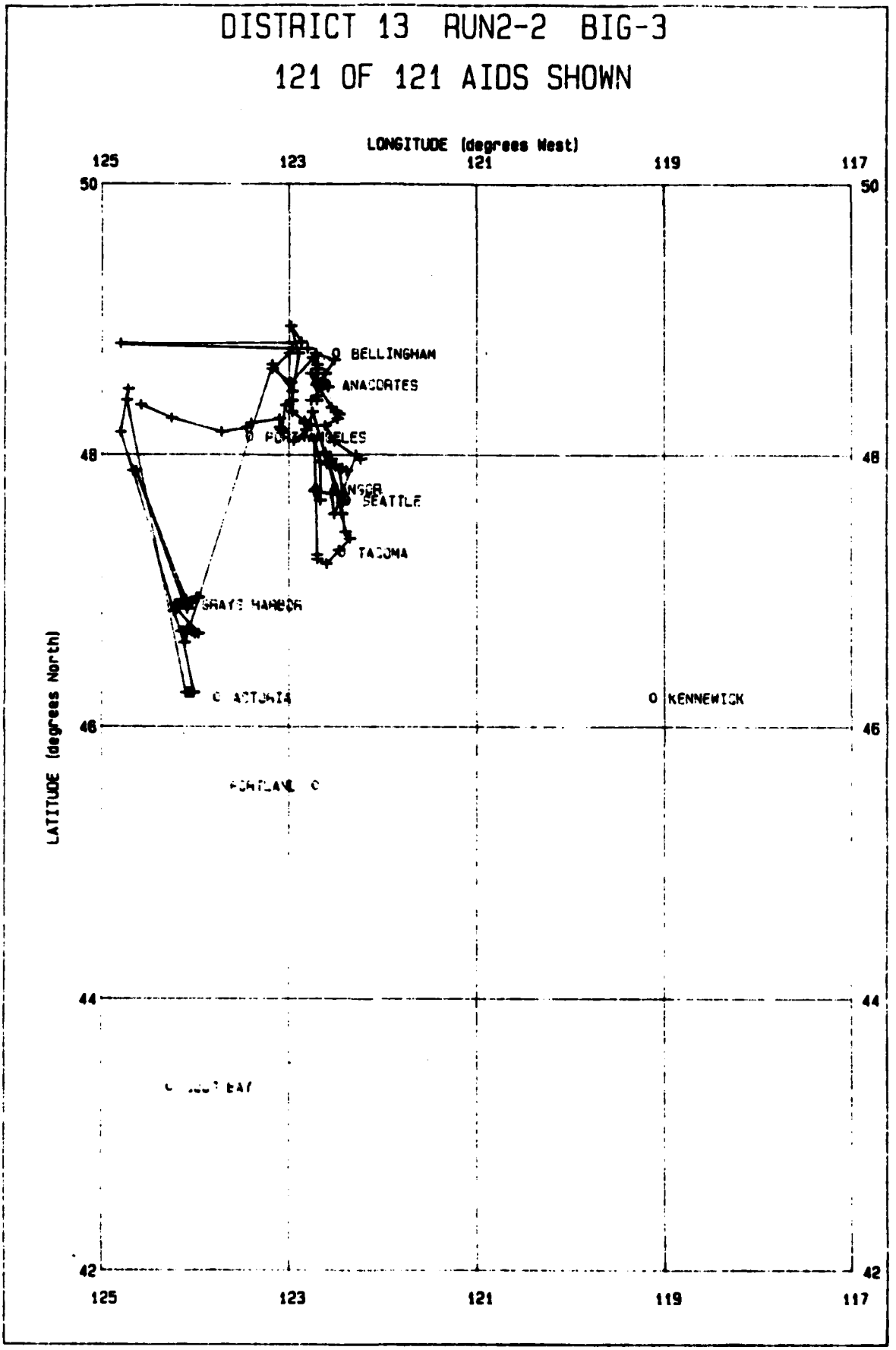
AD-A186 263 SERVICE VESSEL ANALYSIS VOLUME 2 DETAILED DISTRICT PLOTS(U) TRANSPORTATION SYSTEMS CENTER CAMBRIDGE MA G J SKALIOTIS SEP 87 DOT-TSC-CG-87-V2 2/2

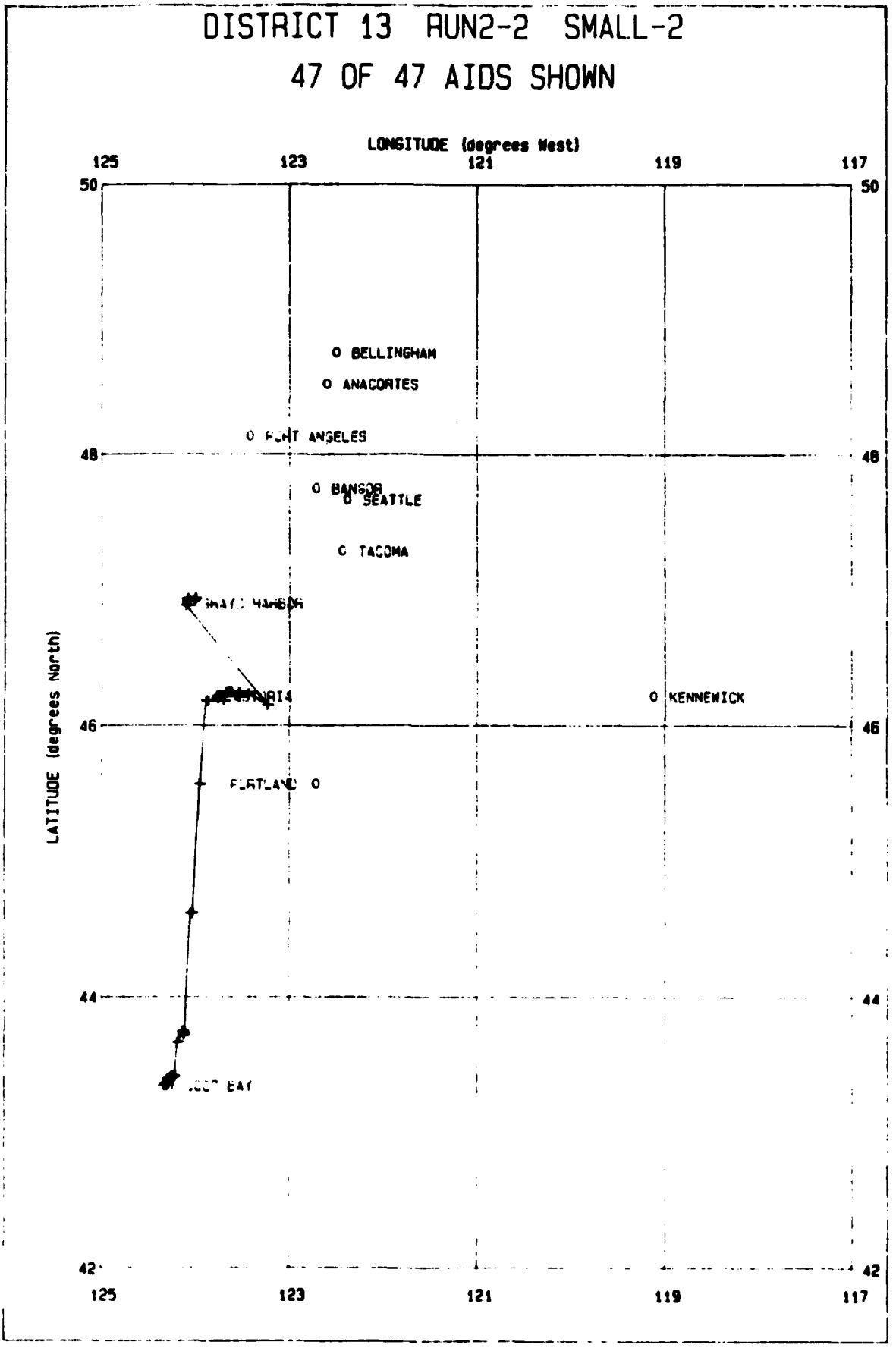
UNCLASSIFIED F/G 15/5 NL

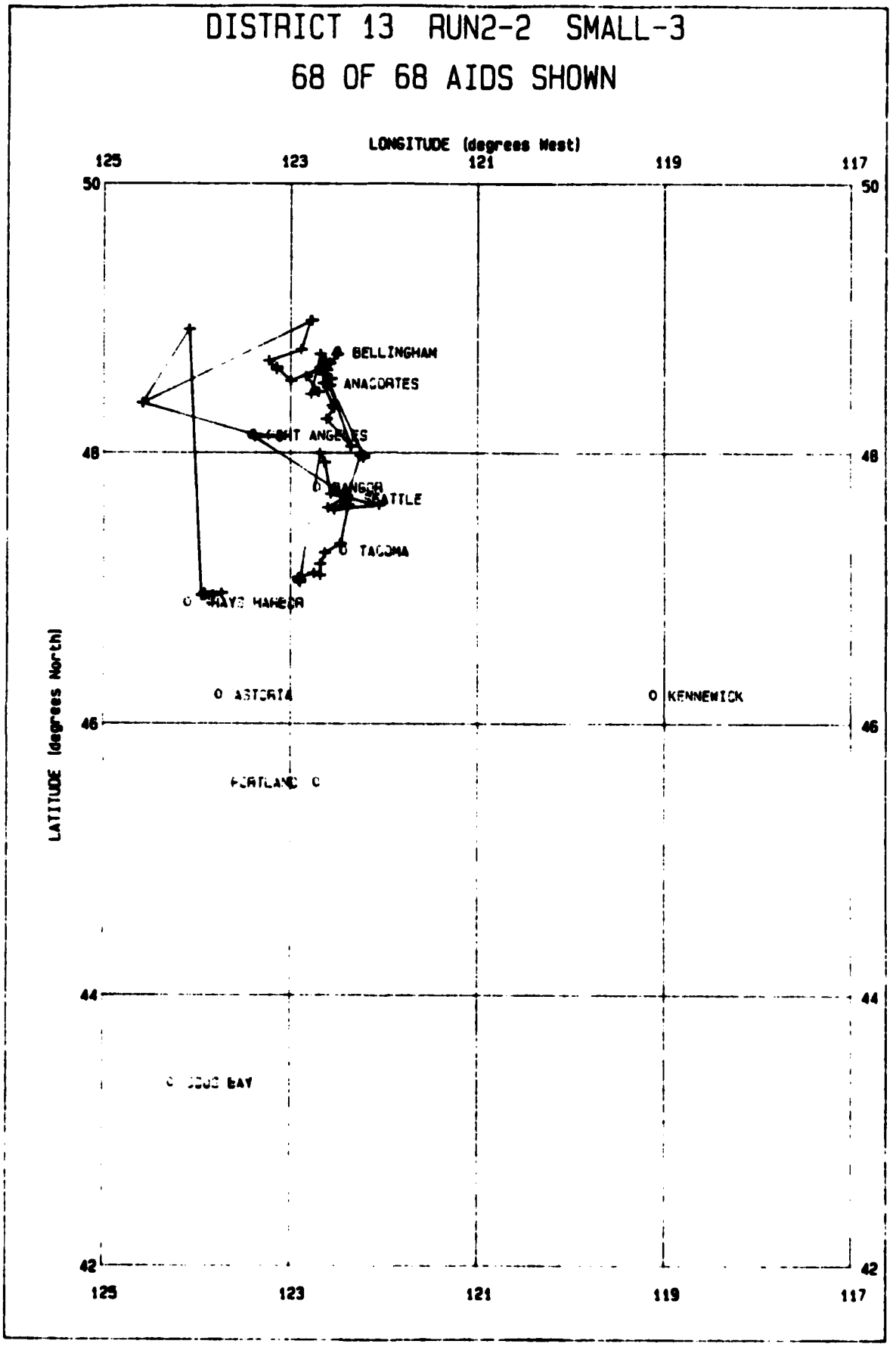


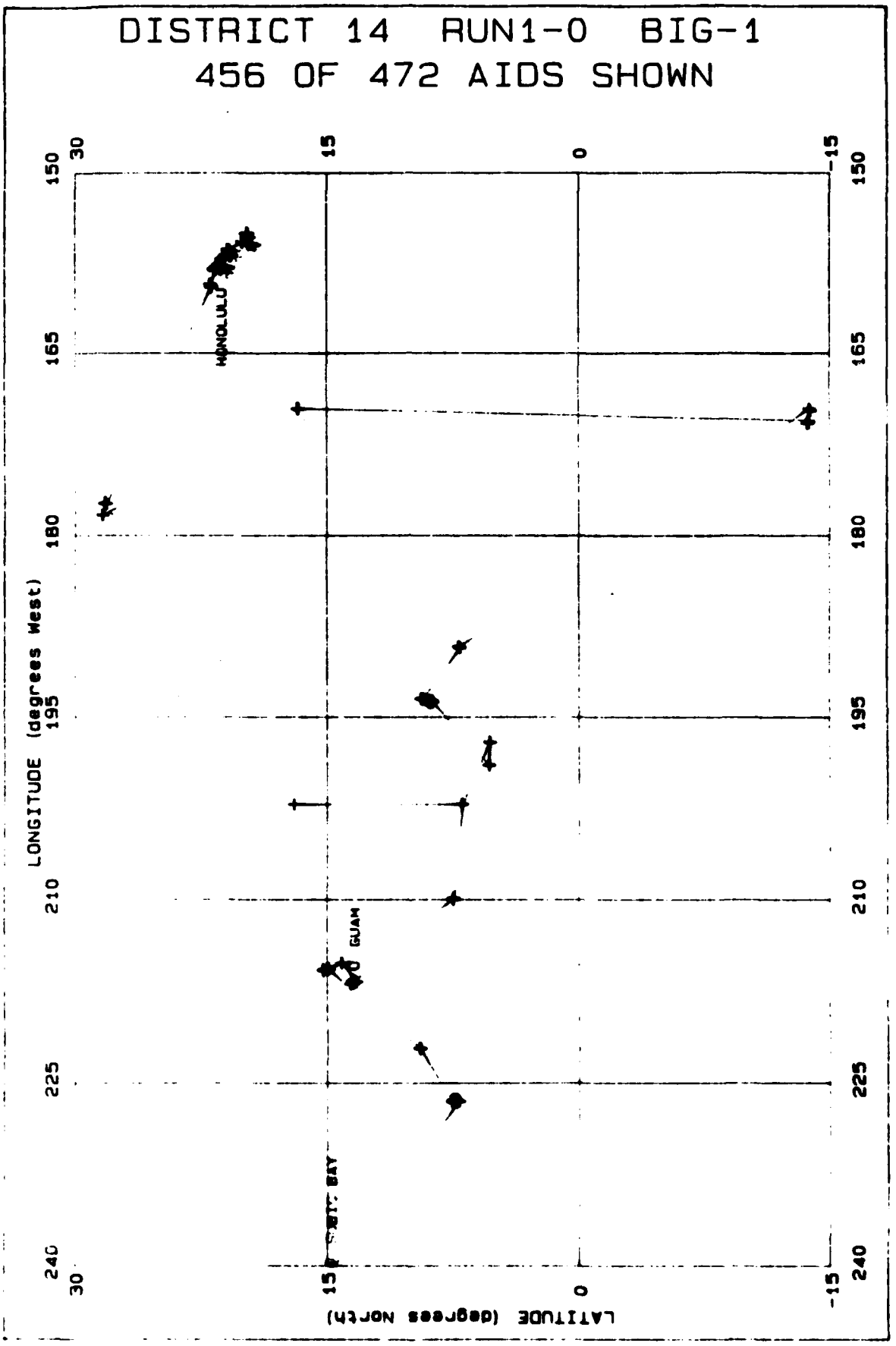
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

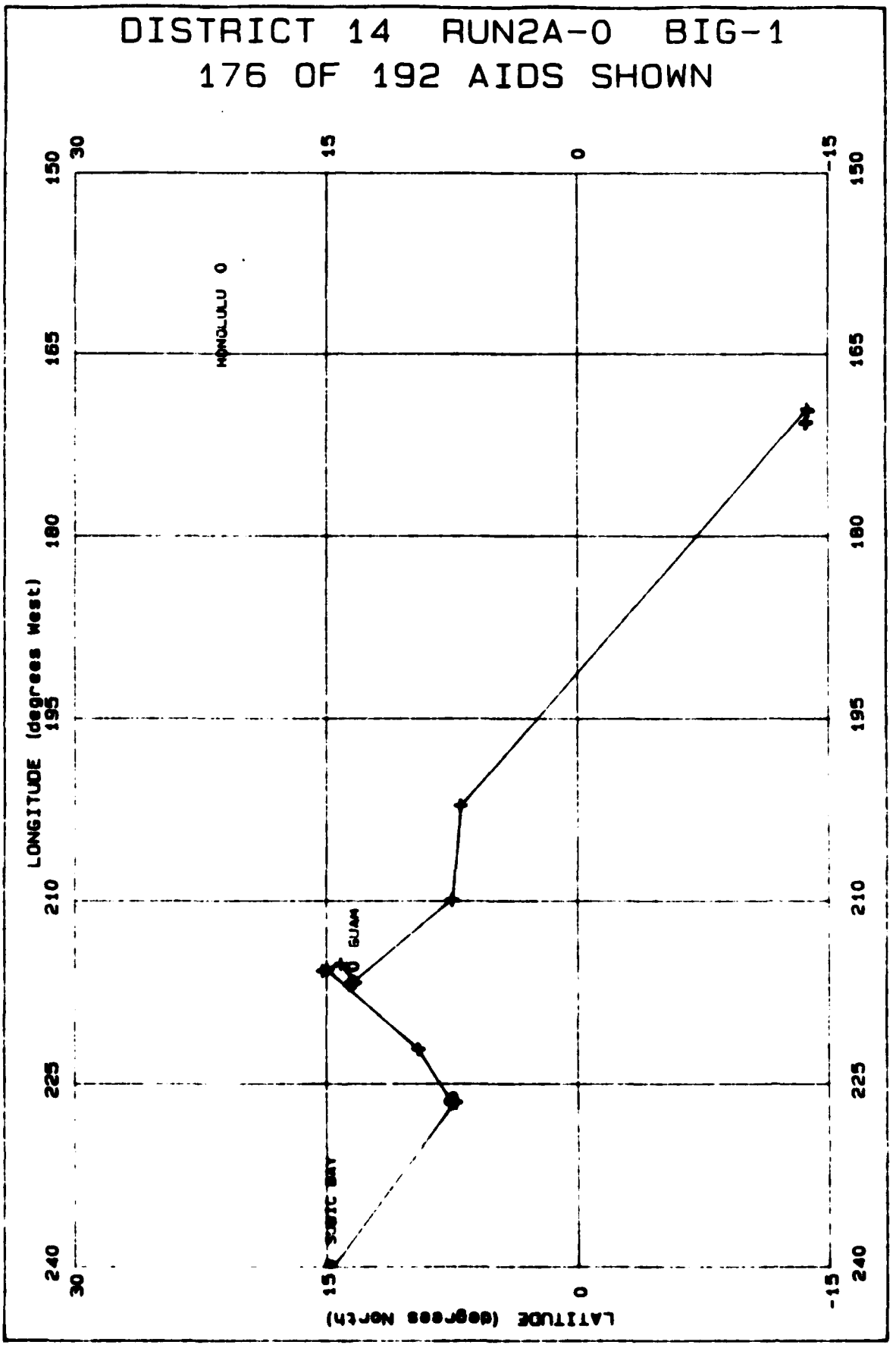

DISTRICT 13 RUN2-2 BIG-2
56 OF 56 AIDS SHOWN
LONGITUDE (degrees West)
125
123
121
119
117
50
48
46
44
42
LATITUDE (degrees North)
BELLINGHAM
ANACORTES
PORT ANGELES
BANGOR
SEATTLE
TACOMA
GRAYS HARBOR
ASTORIA
KENNEWICK
PORTLAND
COOS BAY

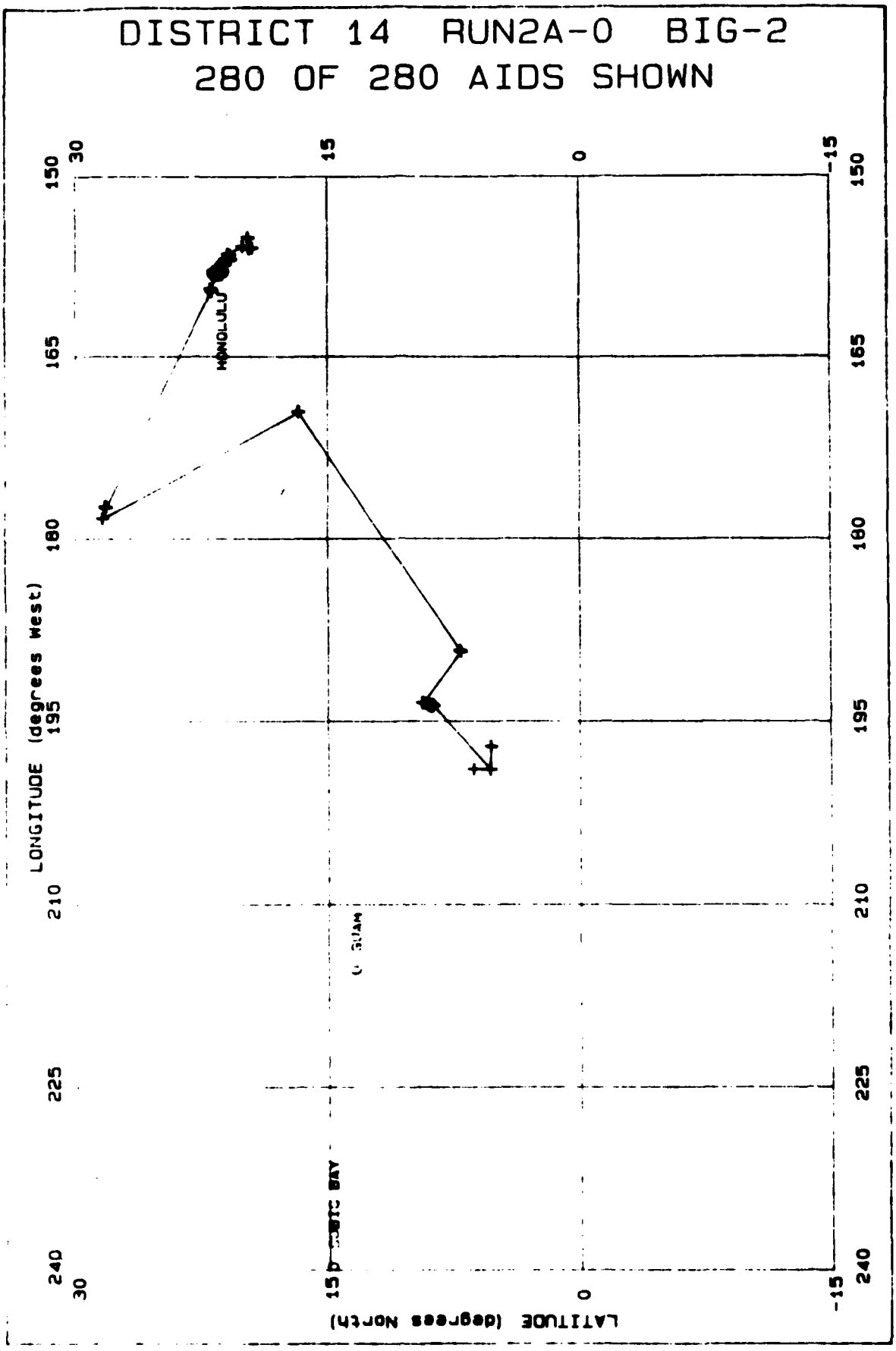

DISTRICT 13 RUN2-2 BIG-3
121 OF 121 AIDS SHOWN
LONGITUDE (degrees West)
125
123
121
119
117
50
48
46
44
42
LATITUDE (degrees North)
BELLINGHAM
ANACORTES
SEATTLE
TACOMA
KENNEWICK


DISTRICT 13 RUN2-2 SMALL-2
47 OF 47 AIDS SHOWN
LONGITUDE (degrees West)
125
123
121
119
117
50
48
46
44
42
LATITUDE (degrees North)
BELLINGHAM
ANACORTES
PORT ANGELES
BANGOR
SEATTLE
TACOMA
KENNEWICK
PORTLAND

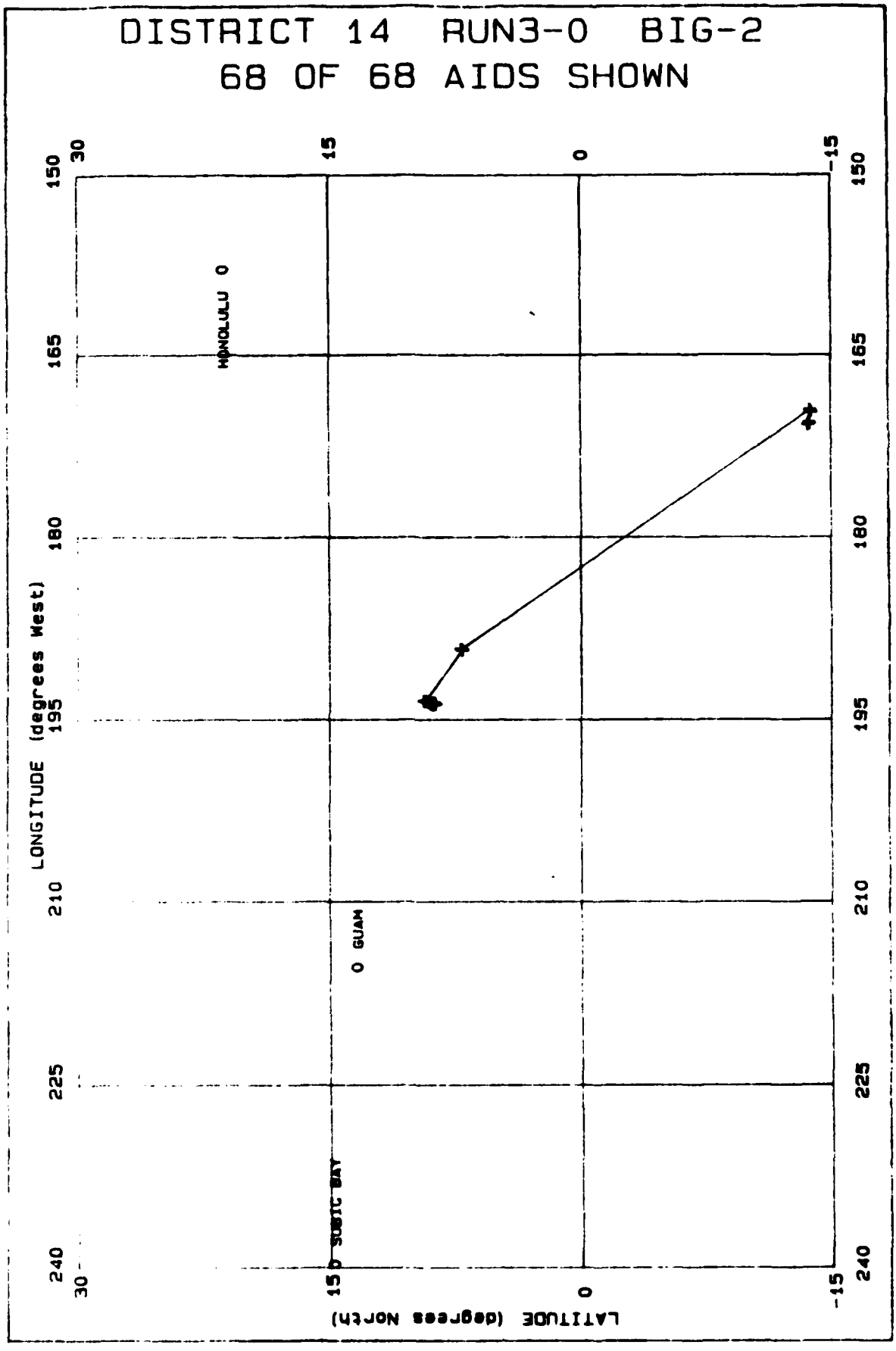

DISTRICT 13 RUN2-2 SMALL-3
68 OF 68 AIDS SHOWN
LONGITUDE (degrees West)
125
123
121
119
117
50
48
46
44
42
LATITUDE (degrees North)
BELLINGHAM
ANACORTES
TACOMA
ASTORIA
KENNEWICK
PORTLAND

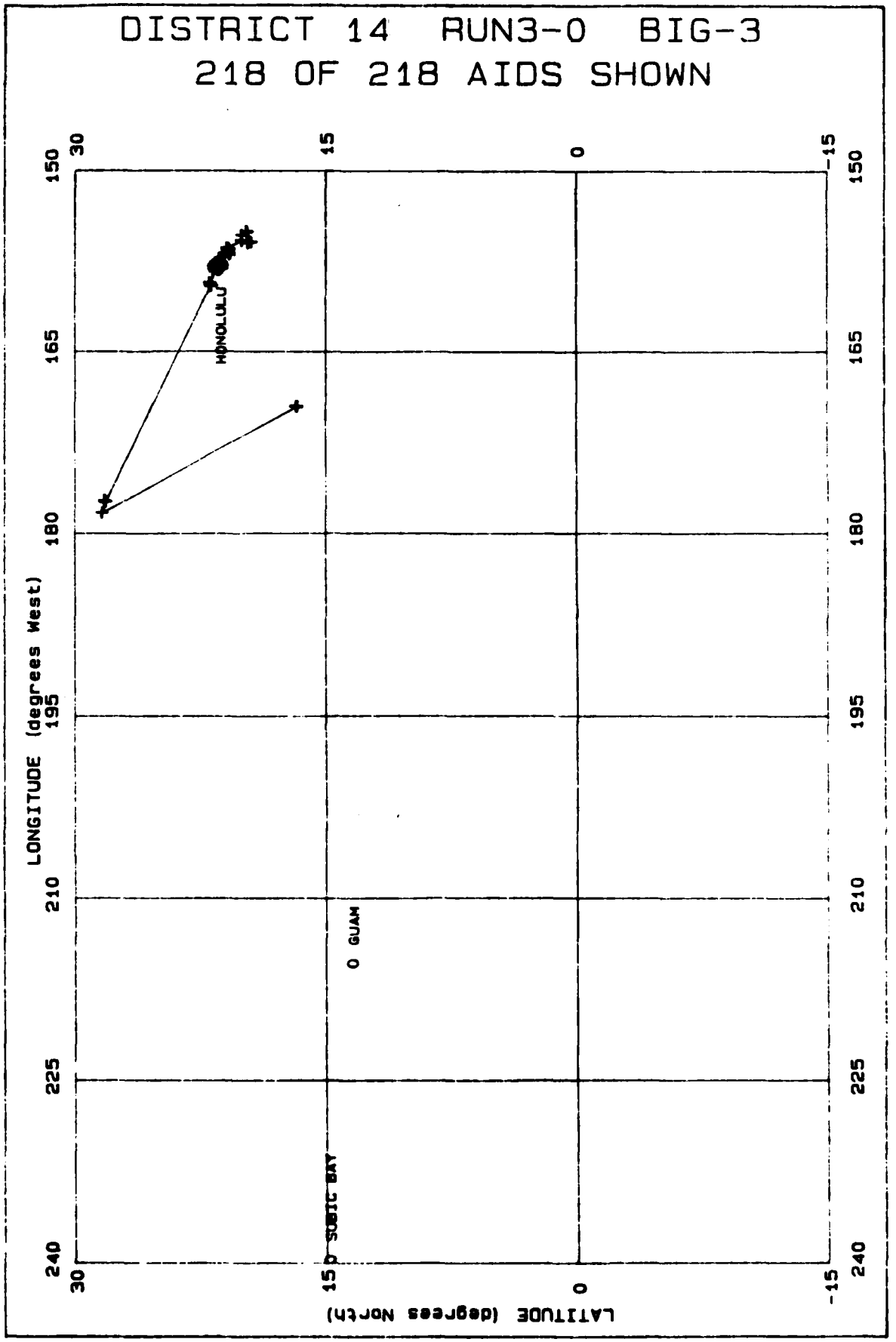

DISTRICT 14 RUN1-0 BIG-1
456 OF 472 AIDS SHOWN
30
15
0
-15
150
165
180
195
210
225
240
HONOLULU
GUAM
LONGITUDE (degrees West)
LATITUDE (degrees North)

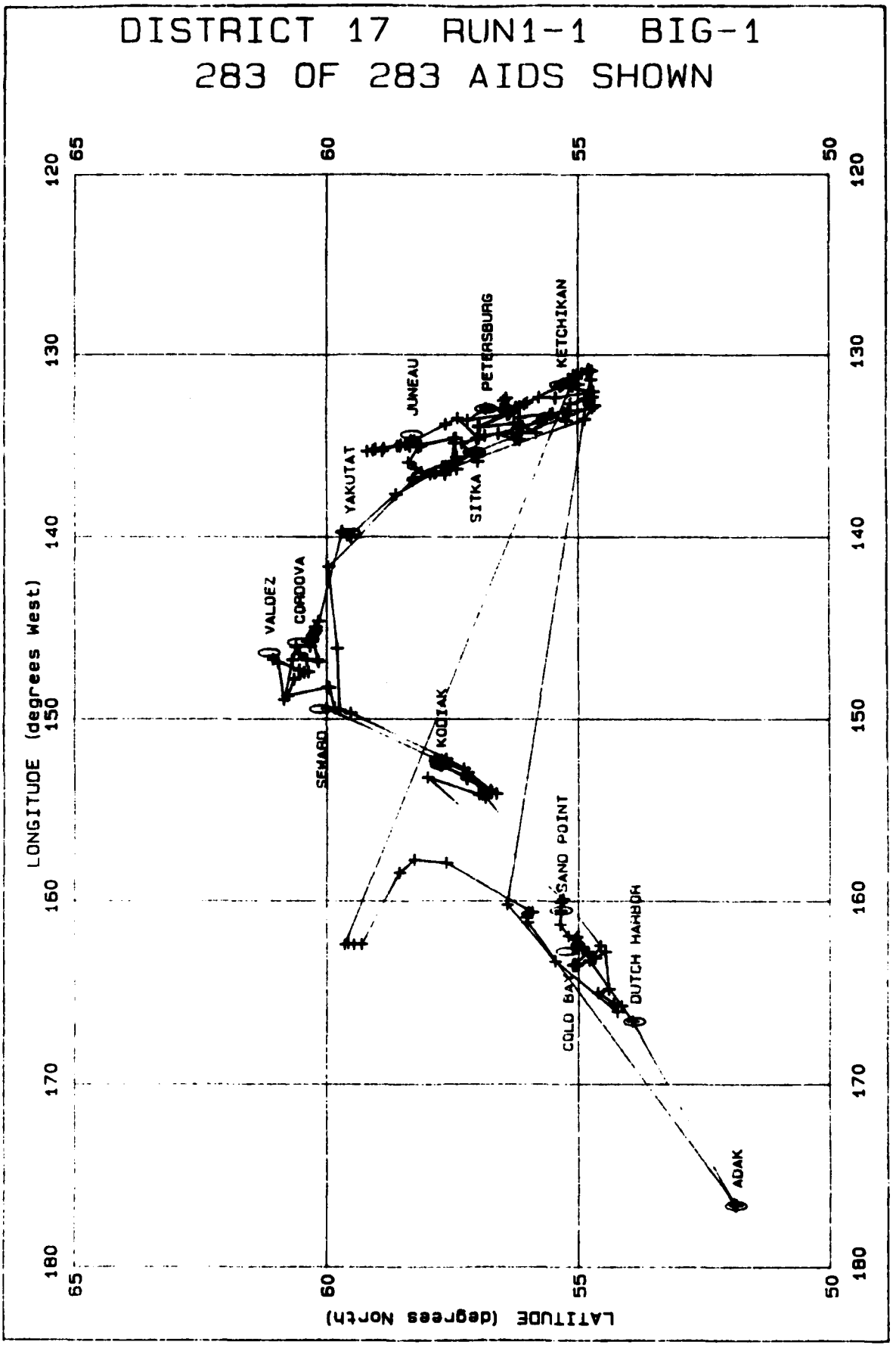

DISTRICT 14 RUN2A-0 BIG-1
176 OF 192 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
HONOLULU
GUAM
JOHNSTON ISLAND
150
165
180
195
210
225
240
30
15
0
-15

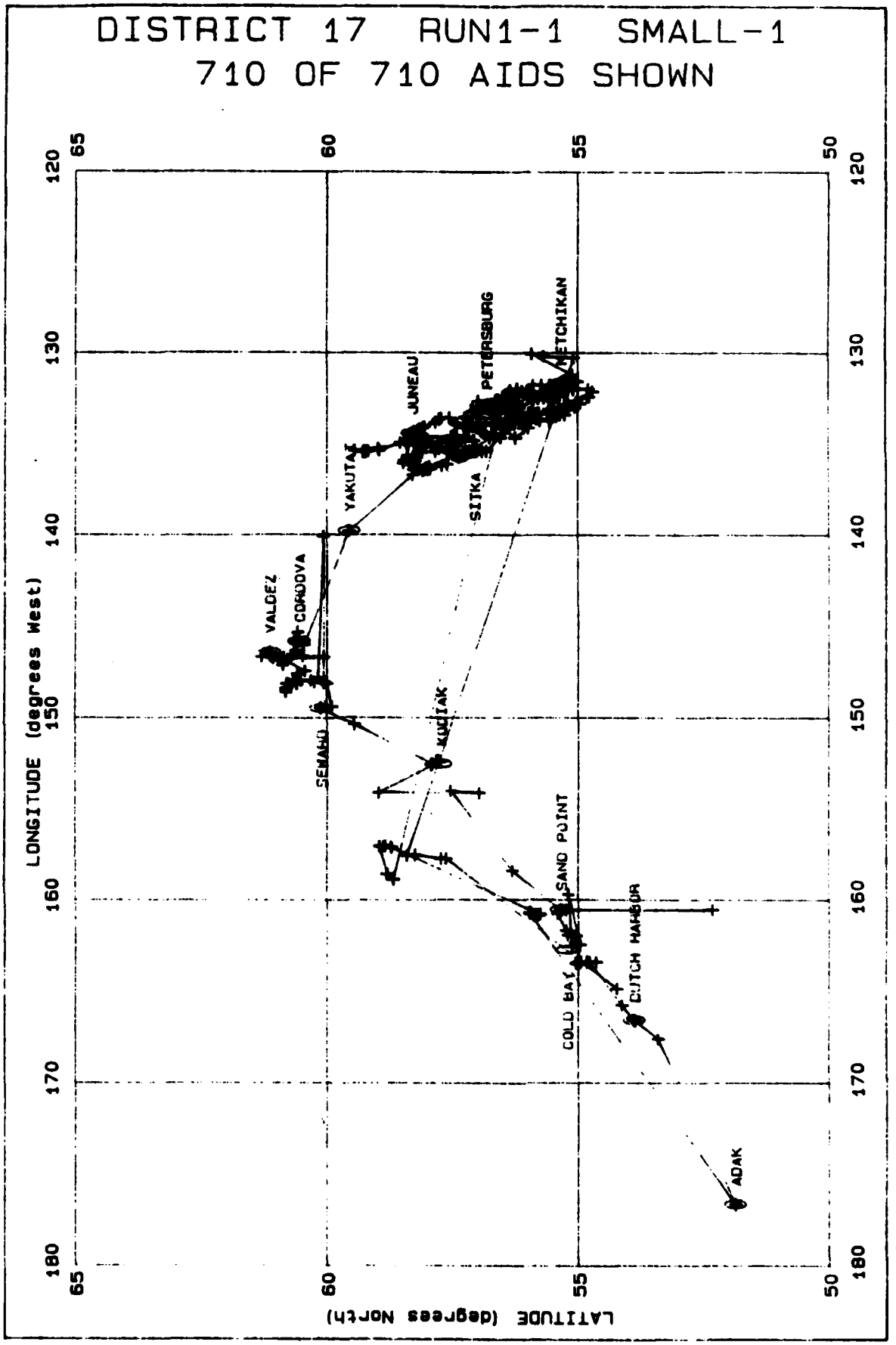

DISTRICT 14 RUN2A-0 BIG-2
280 OF 280 AIDS SHOWN
30
15
0
-15
150
165
180
195
210
225
240
HONOLULU
LONGITUDE (degrees West)
LATITUDE (degrees North)

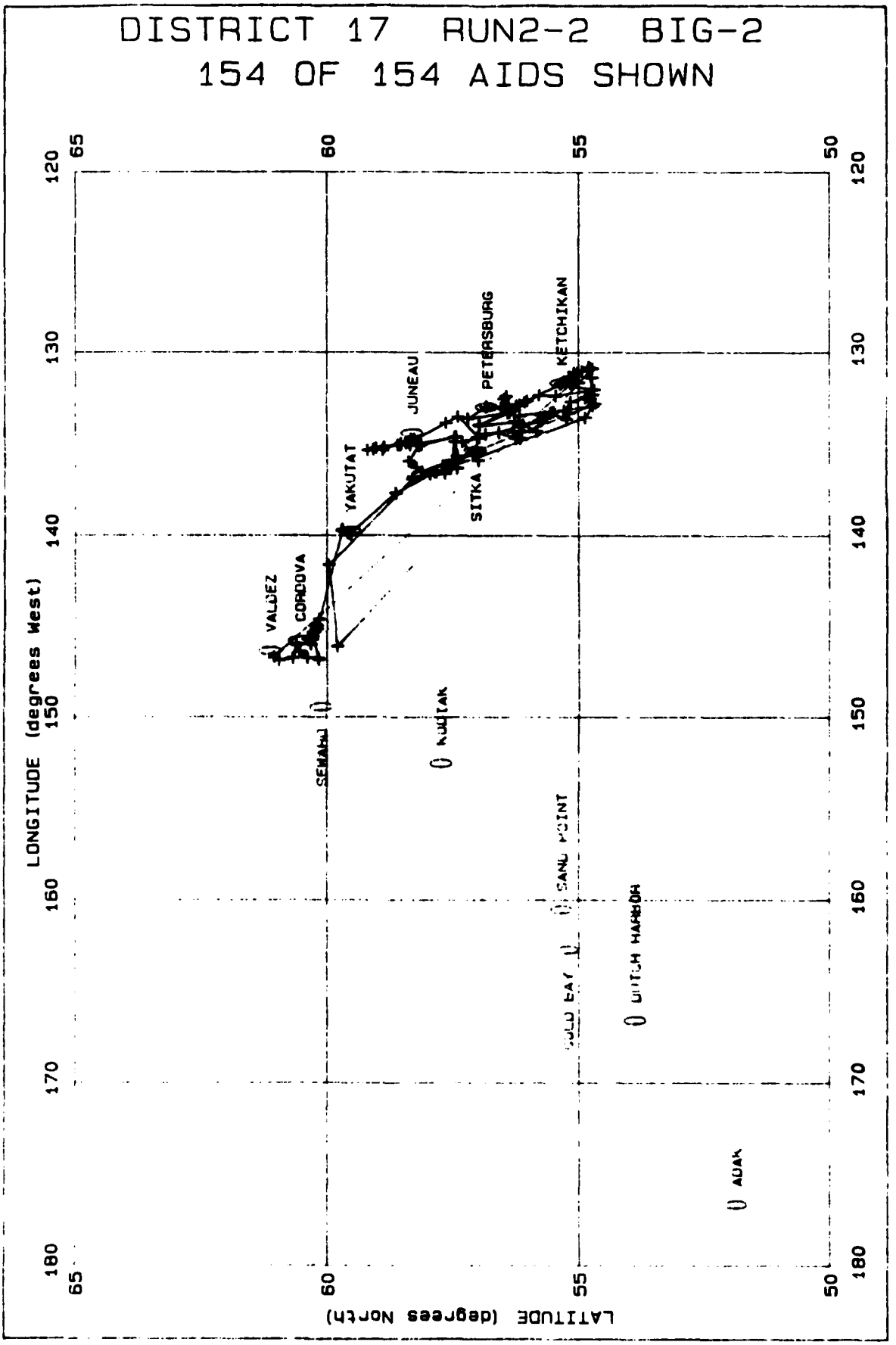
DISTRICT 14 RUN3-0 BIG-1
170 OF 186 AIDS SHOWN
HONOLULU 0
GUAM
SUBIC BAY
LONGITUDE (degrees West)
LATITUDE (degrees North)
150
165
180
195
210
225
240
30
15
0
-15

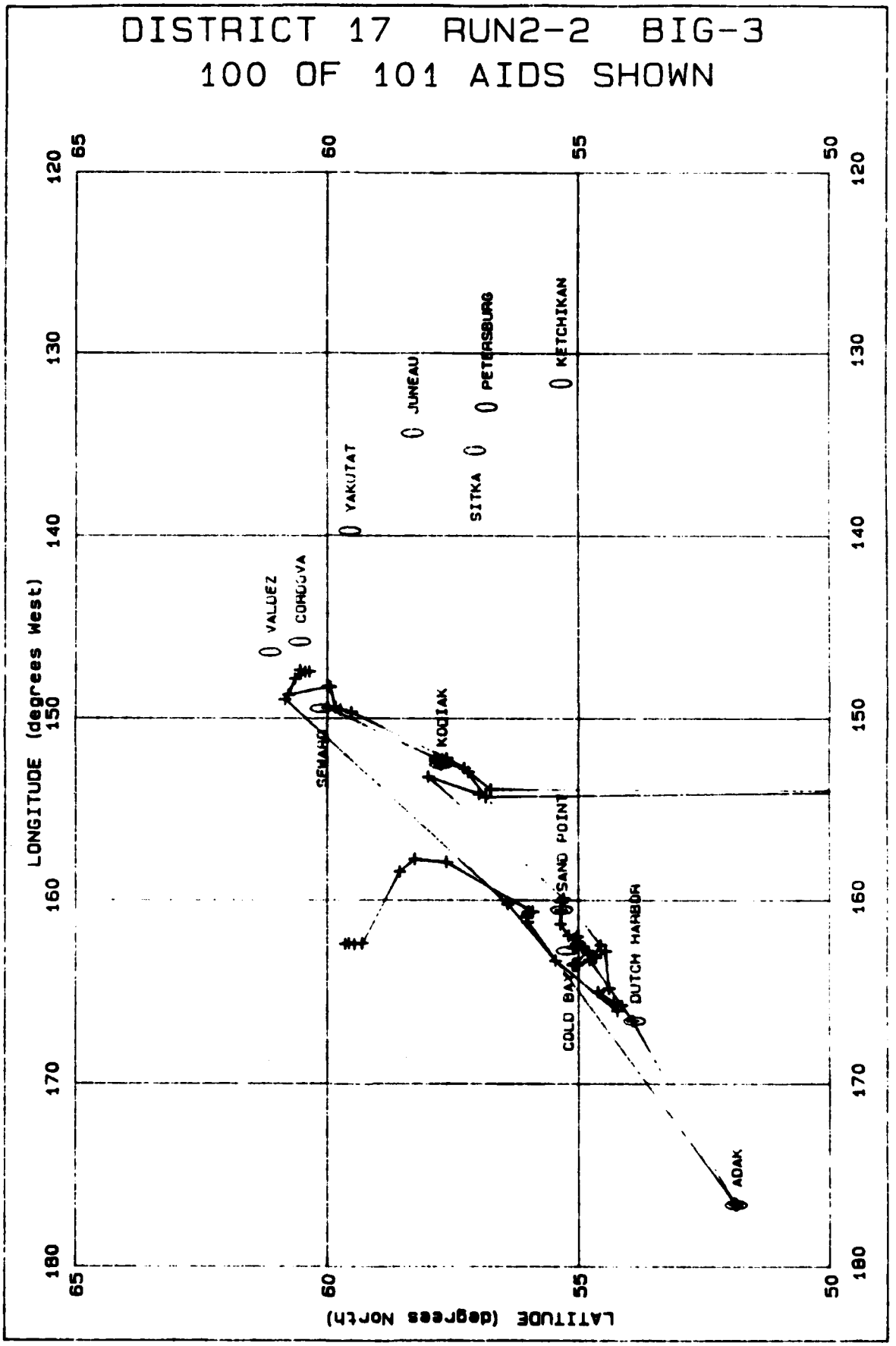

DISTRICT 14 RUN3-0 BIG-2
68 OF 68 AIDS SHOWN
LONGITUDE (degrees West)
150
165
180
195
210
225
240
30
15
0
-15
HONOLULU 0
0 GUAM
SUBIC BAY
LATITUDE (degrees North)

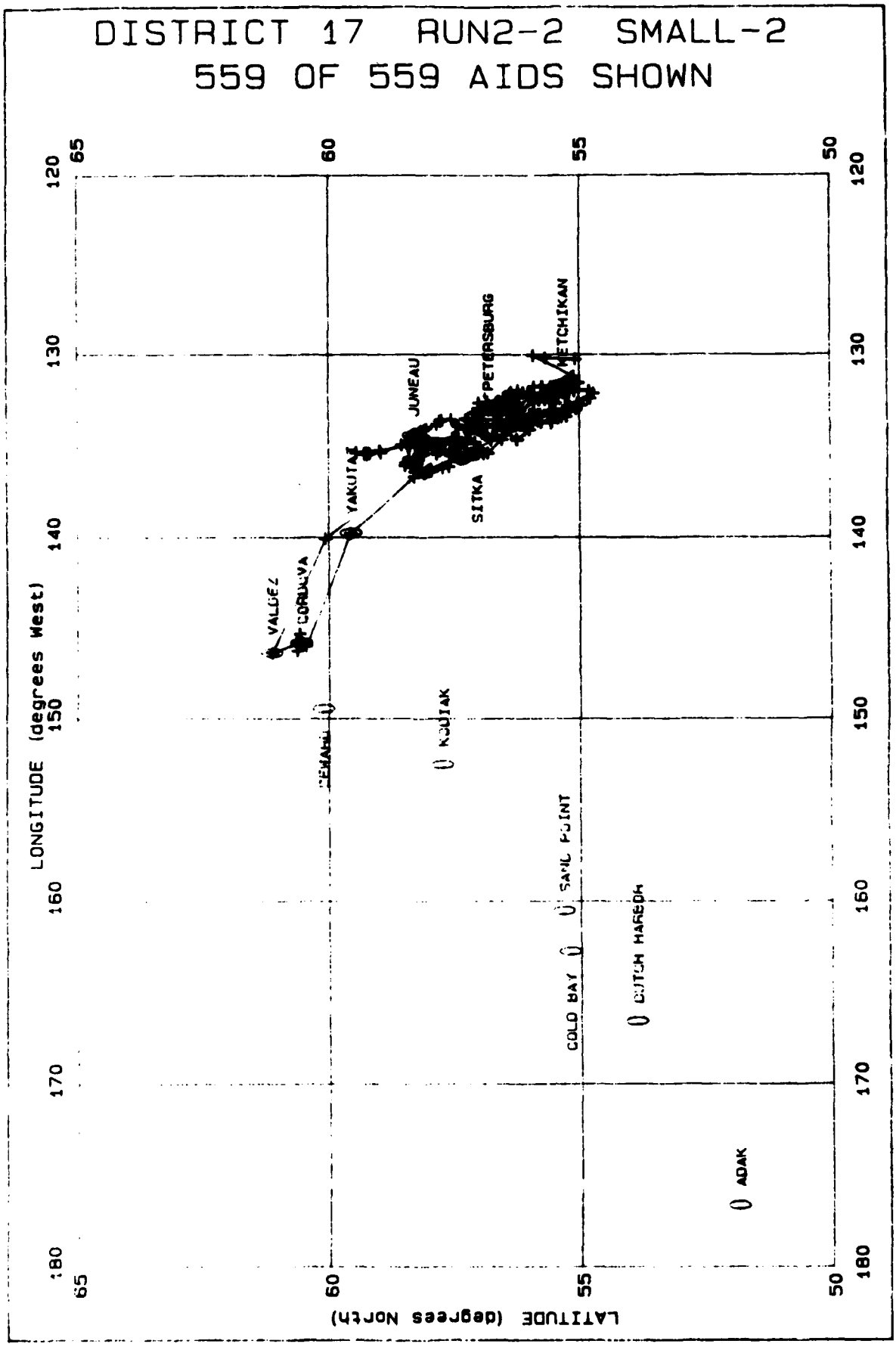

DISTRICT 14 RUN3-0 BIG-3
218 OF 218 AIDS SHOWN
LONGITUDE (degrees West)
150
165
180
195
210
225
240
30
15
0
-15
HONOLULU
GUAM
SUBIC BAY
LATITUDE (degrees North)


DISTRICT 17 RUN1-1 BIG-1
283 OF 283 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
KETCHIKAN
PETERSBURG
JUNEAU
SITKA
YAKUTAT
CORDOVA
VALDEZ
SEWARD
KODIAK
SAND POINT
COLD BAY
DUTCH HARBOR
ADAK

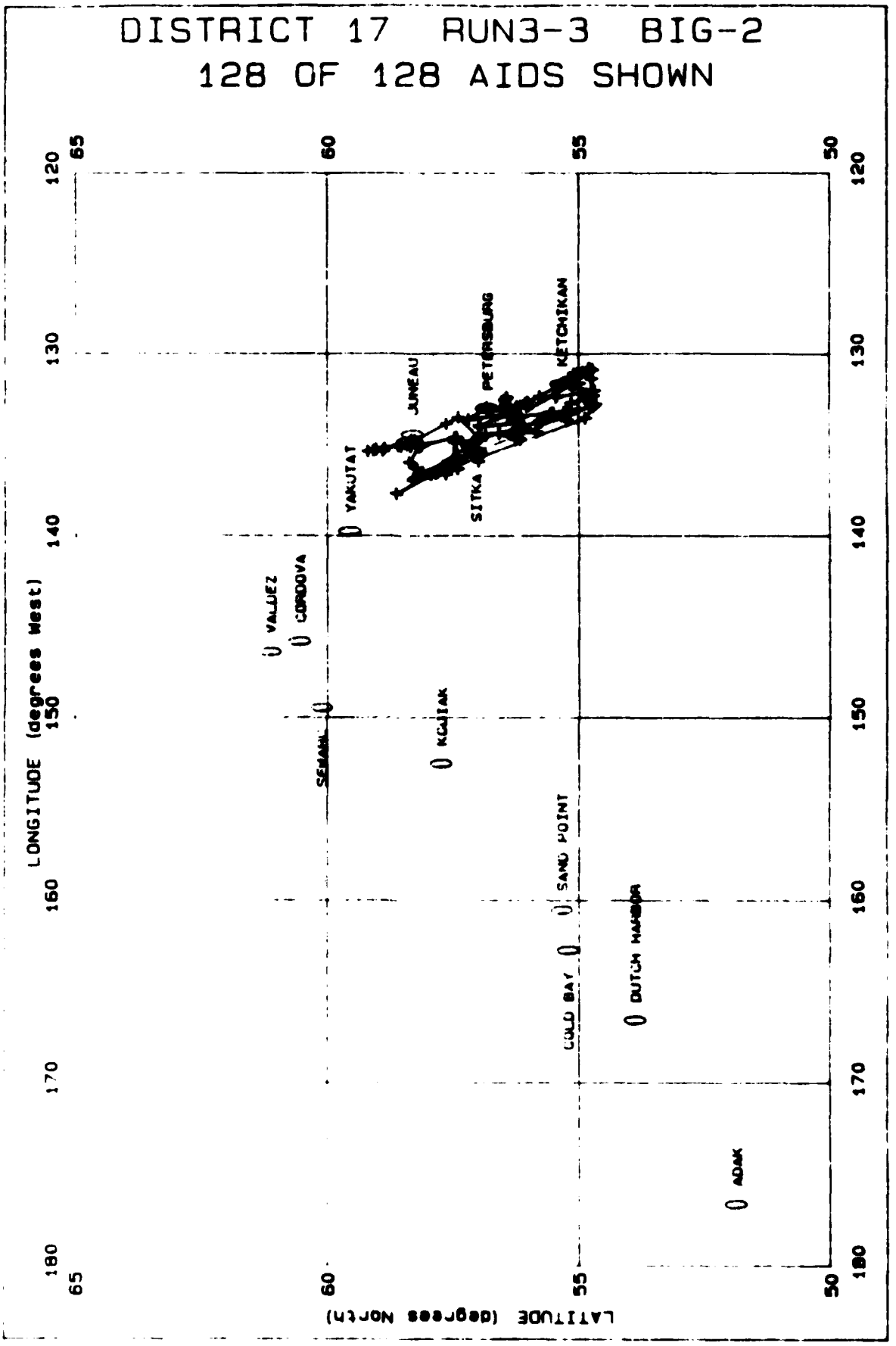

DISTRICT 17 RUN1-1 SMALL-1
710 OF 710 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
KETCHIKAN
PETERSBURG
JUNEAU
SITKA
YAKUTAT
VALDEZ
CORDOVA
SEWARD
KODIAK
SAND POINT
COLD BAY
DUTCH HARBOR
ADAK

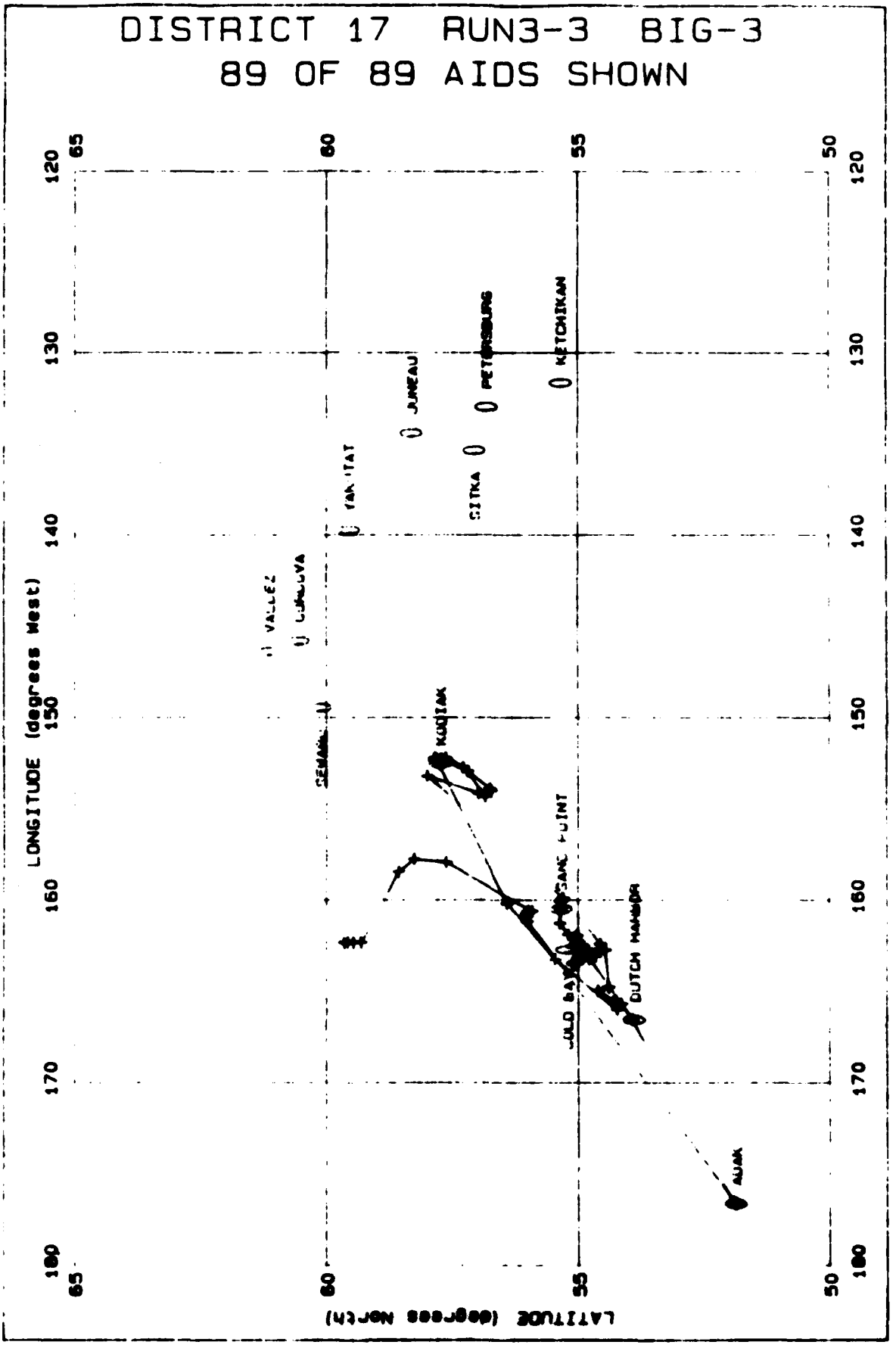

DISTRICT 17 RUN2-2 BIG-2
154 OF 154 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
JUNEAU
PETERSBURG
KETCHIKAN
SITKA
YAKUTAT
CORDOVA
VALDEZ
ADAK

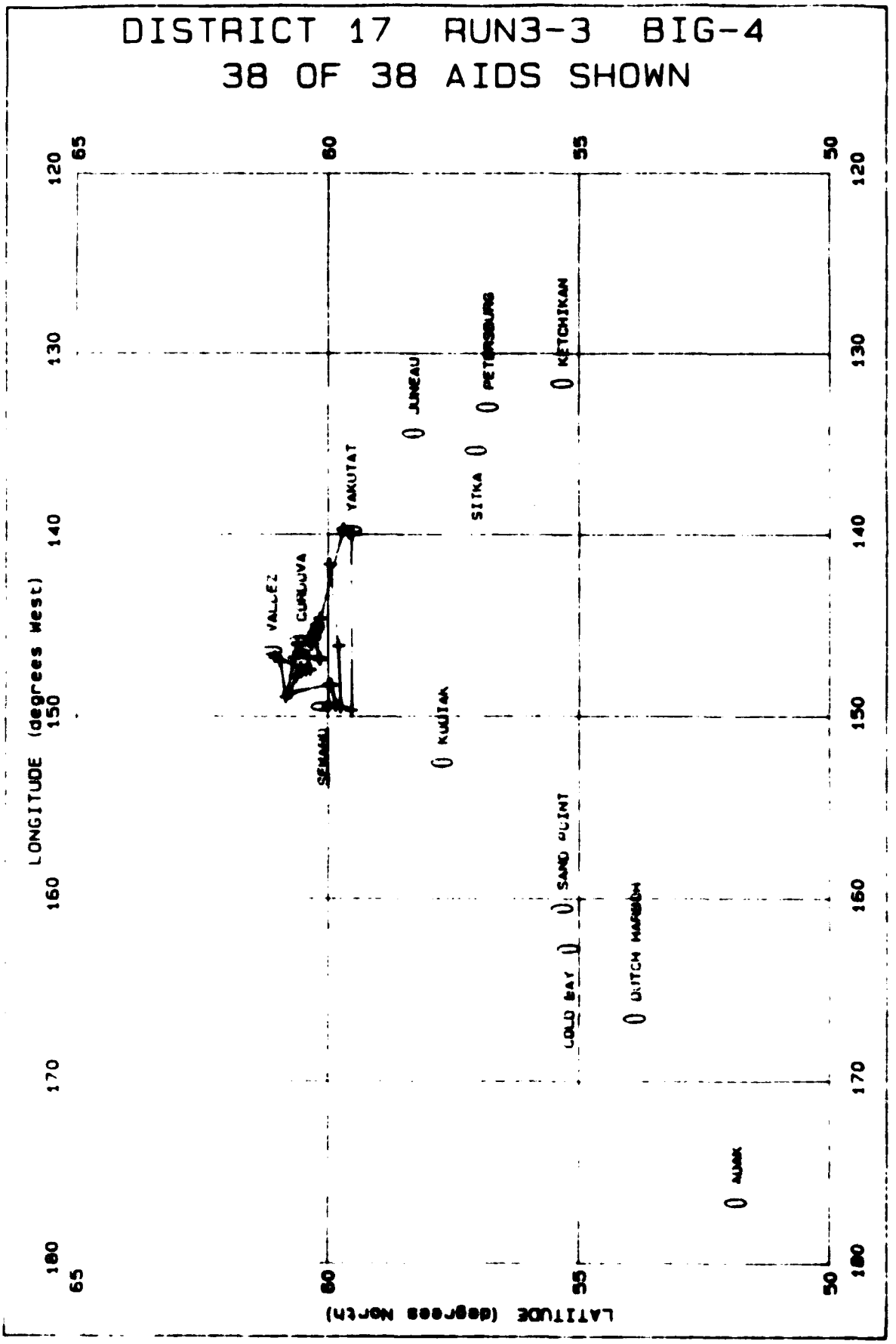

DISTRICT 17 RUN2-2 BIG-3
100 OF 101 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
YAKUTAT
JUNEAU
SITKA
PETERSBURG
KETCHIKAN
VALDEZ
CORDOVA
SEWARD
KODIAK
SAND POINT
COLD BAY
DUTCH HARBOR
ADAK

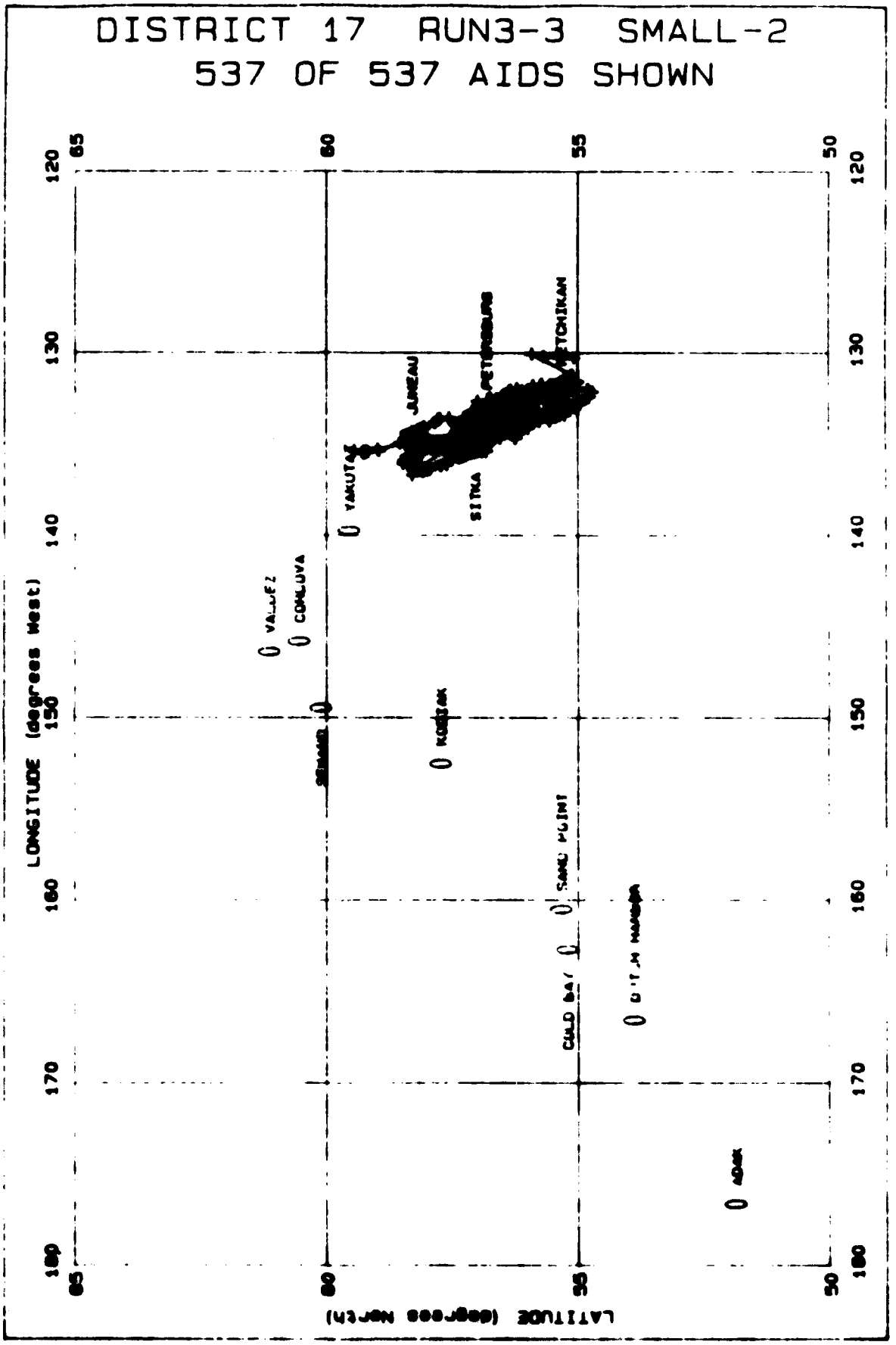

DISTRICT 17 RUN2-2 SMALL-2
559 OF 559 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
JUNEAU
PETERSBURG
KETCHIKAN
SITKA
YAKUTAT
VALDEZ
CORDOVA
KODIAK
COLD BAY
DUTCH HARBOR
ADAK

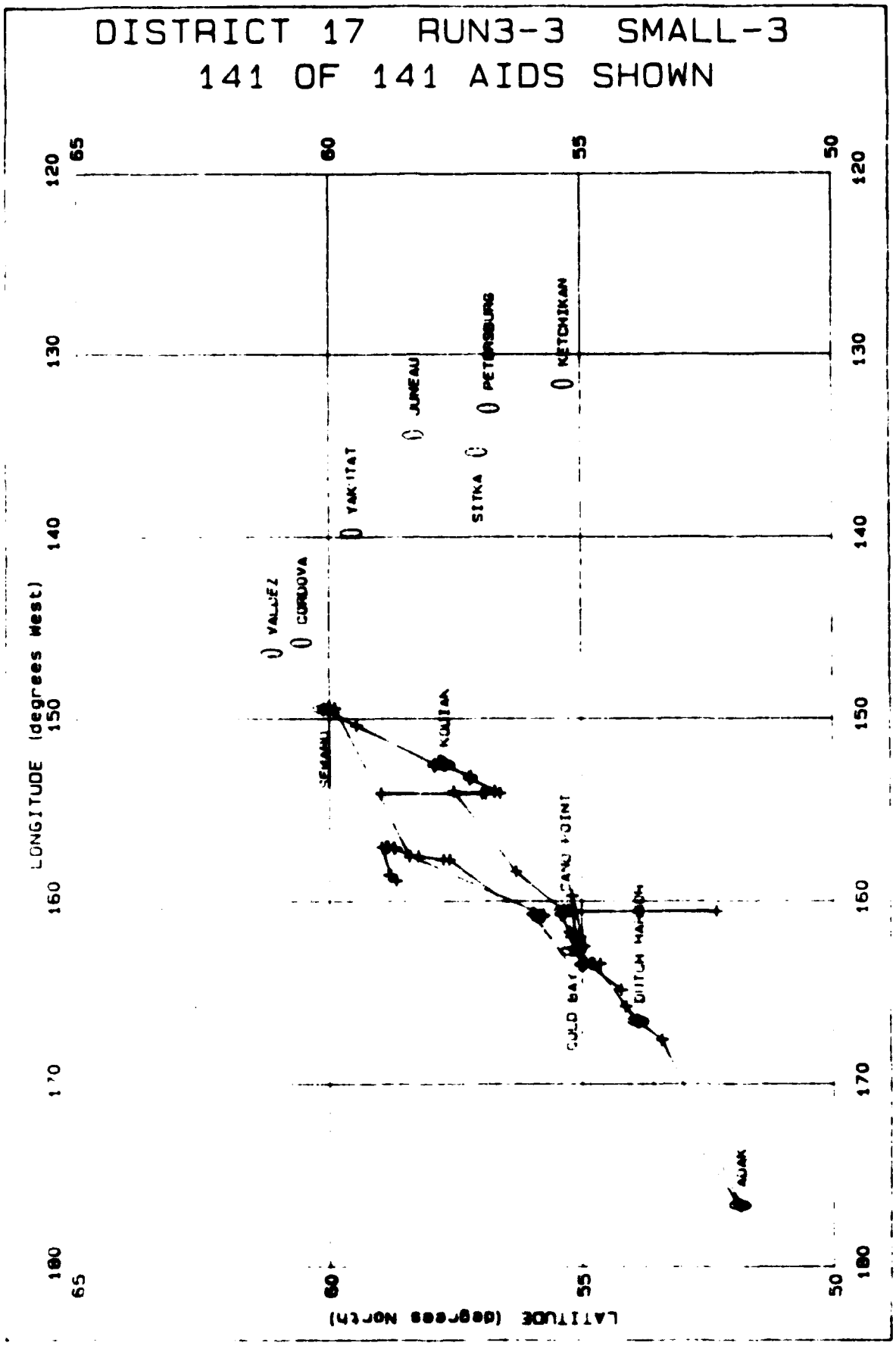
DISTRICT 17 RUN2-2 SMALL-3
178 OF 178 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
120
130
140
150
160
170
180
65
60
55
50
YAKUTAT
JUNEAU
SITKA
PETERSBURG
KETCHIKAN
VALDEZ
COROVA
KODIAK
SAND POINT
DUTCH HARBOR
ADAK

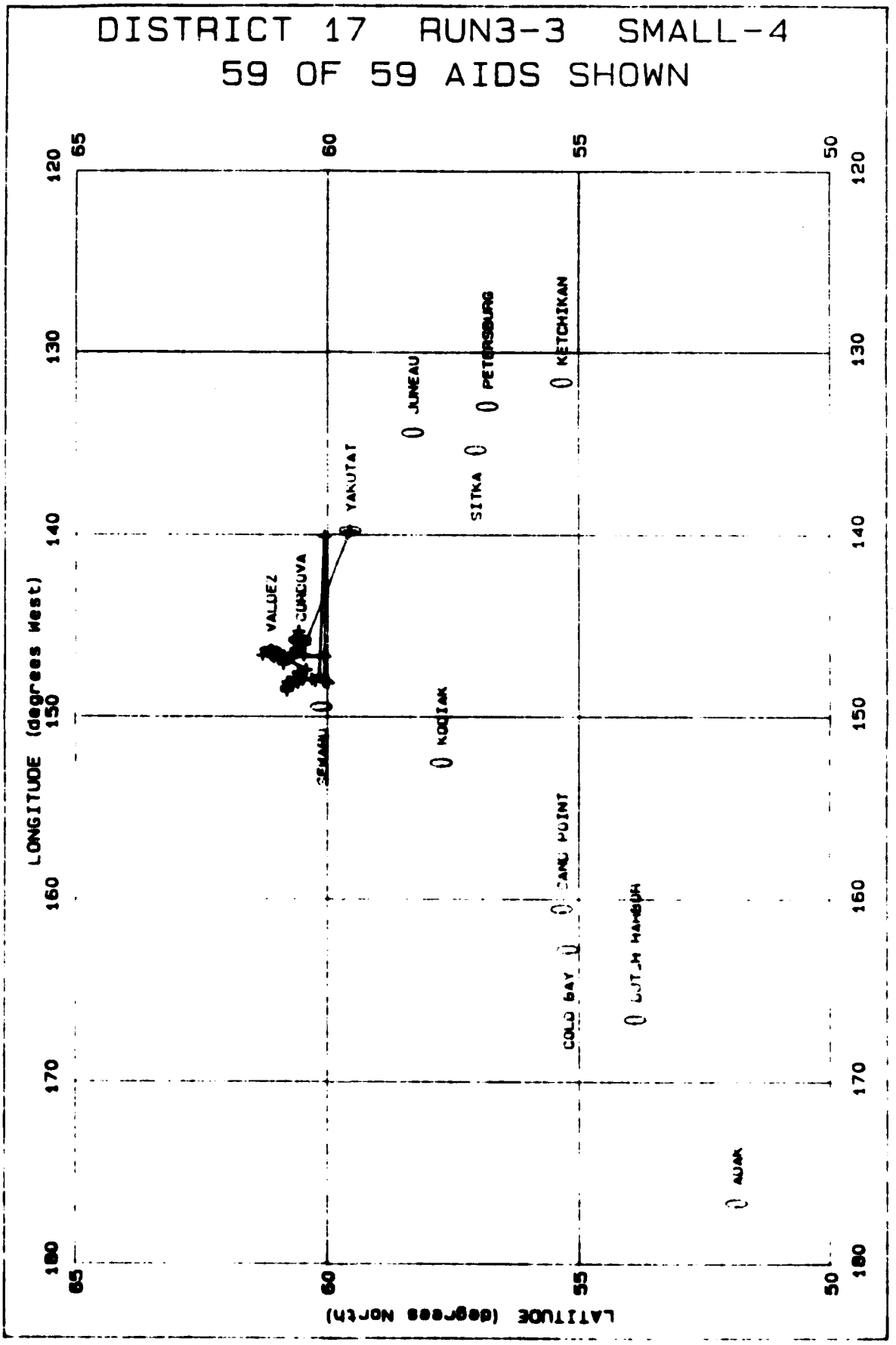

DISTRICT 17 RUN3-3 BIG-2
128 OF 128 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
JUNEAU
PETERSBURG
KETCHIKAN
YAKUTAT
SITKA
VALDEZ
CORDOVA
KODIAK
SAND POINT
COLD BAY
DUTCH HARBOR
ADAK

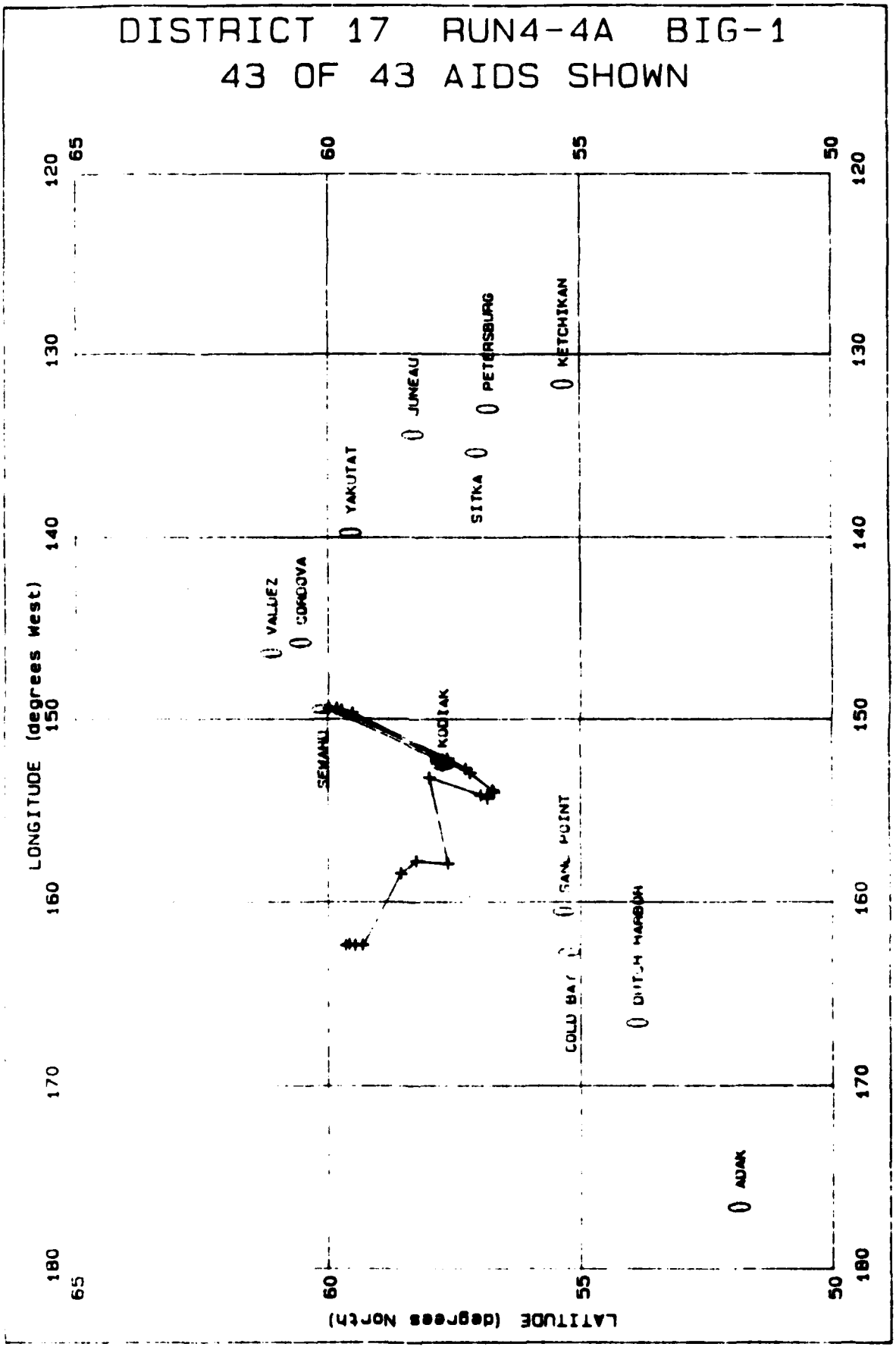

DISTRICT 17 RUN3-3 BIG-3
89 OF 89 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
JUNEAU
PETERSBURG
KETCHIKAN
SITKA
KODIAK
DUTCH HARBOR
ADAK

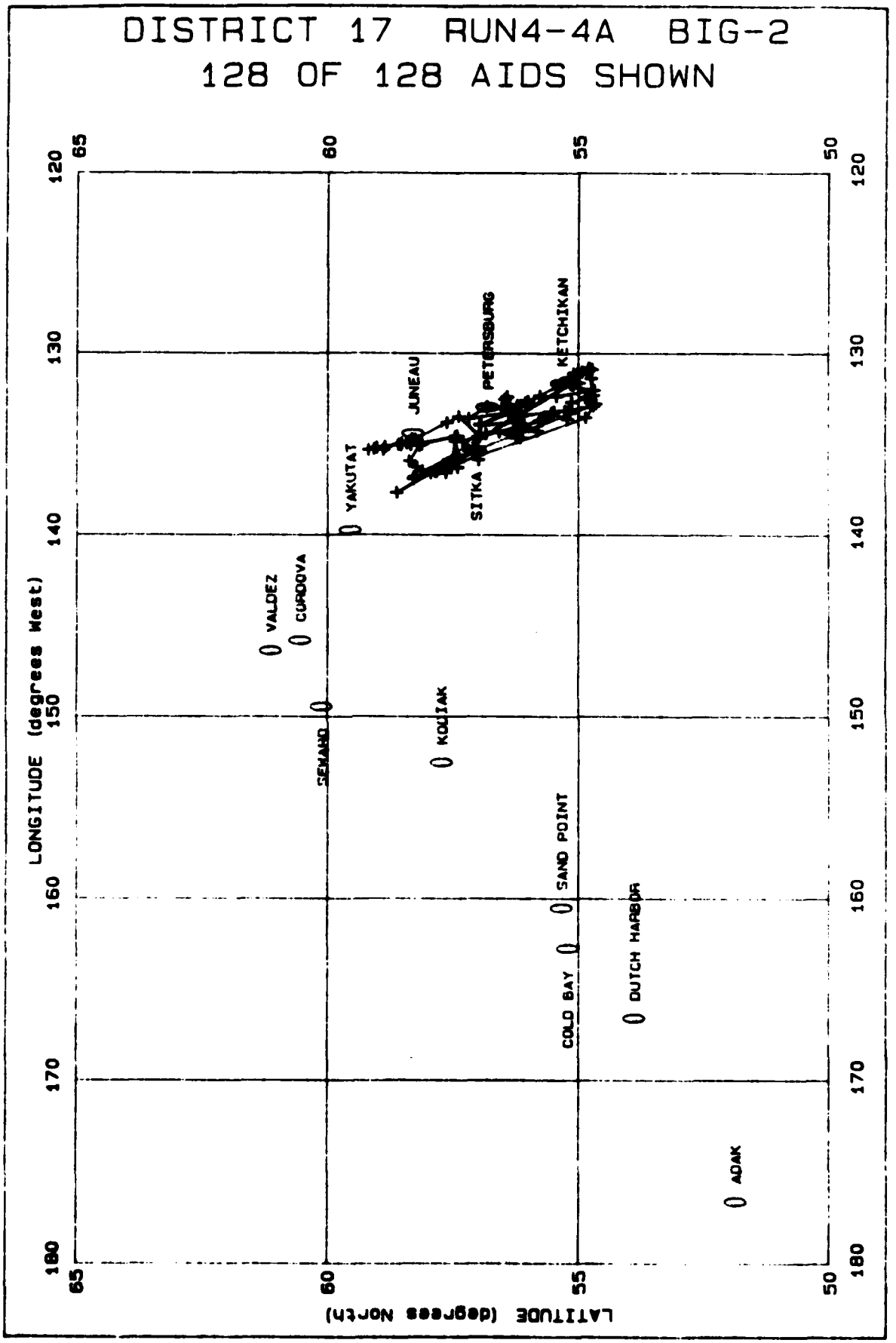

DISTRICT 17 RUN3-3 BIG-4
38 OF 38 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
YAKUTAT
JUNEAU
SITKA
PETERSBURG
KETCHIKAN
VALDEZ
CORDOVA
KODIAK
SAND POINT
COLD BAY
DUTCH HARBOR
NOME

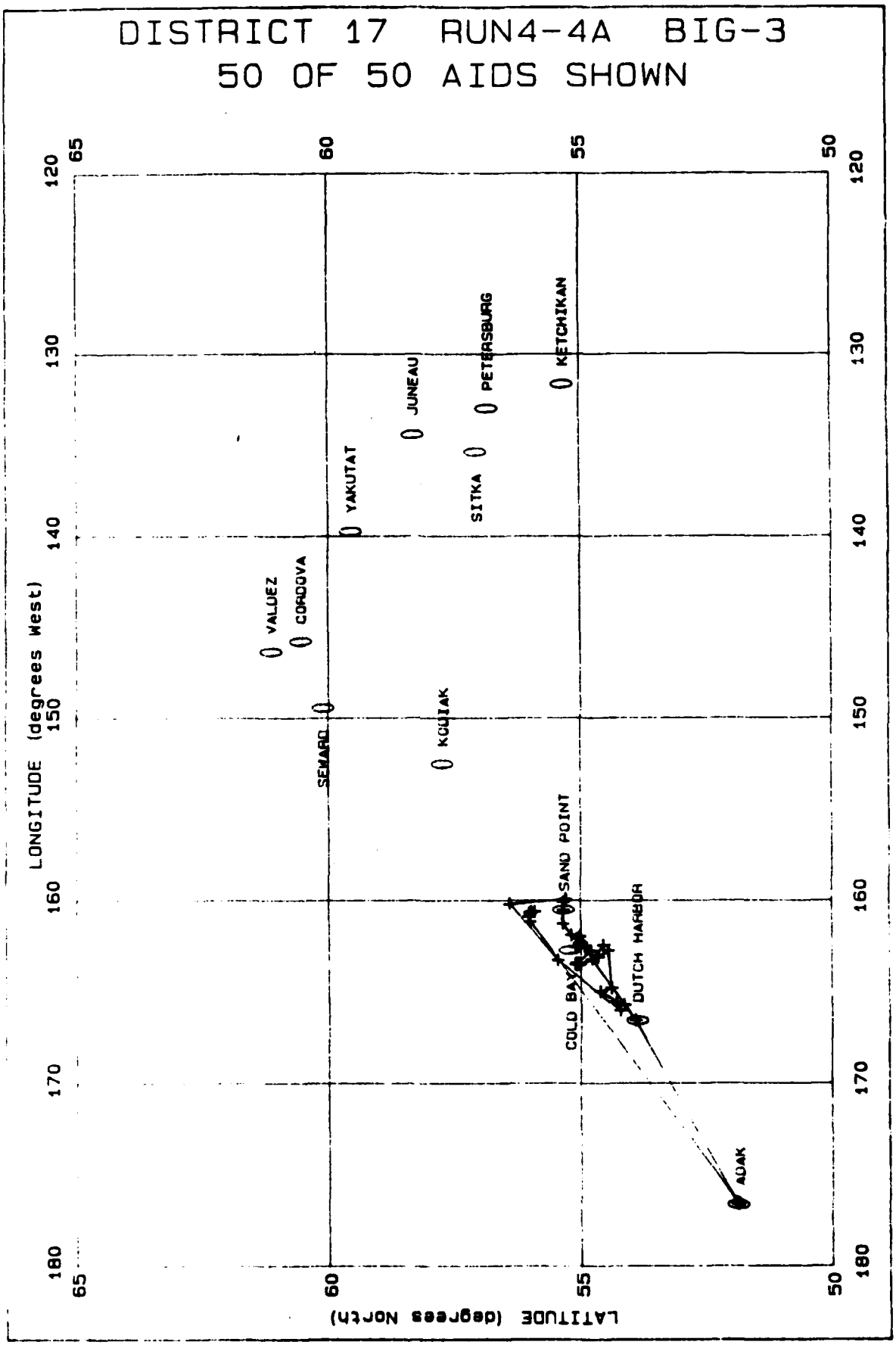

DISTRICT 17 RUN3-3 SMALL-2
537 OF 537 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
JUNEAU
PETERSBURG
KETCHIKAN
SITKA
YAKUTAT
CORDOVA
KODIAK
SAND POINT
COLD BAY
ADAK

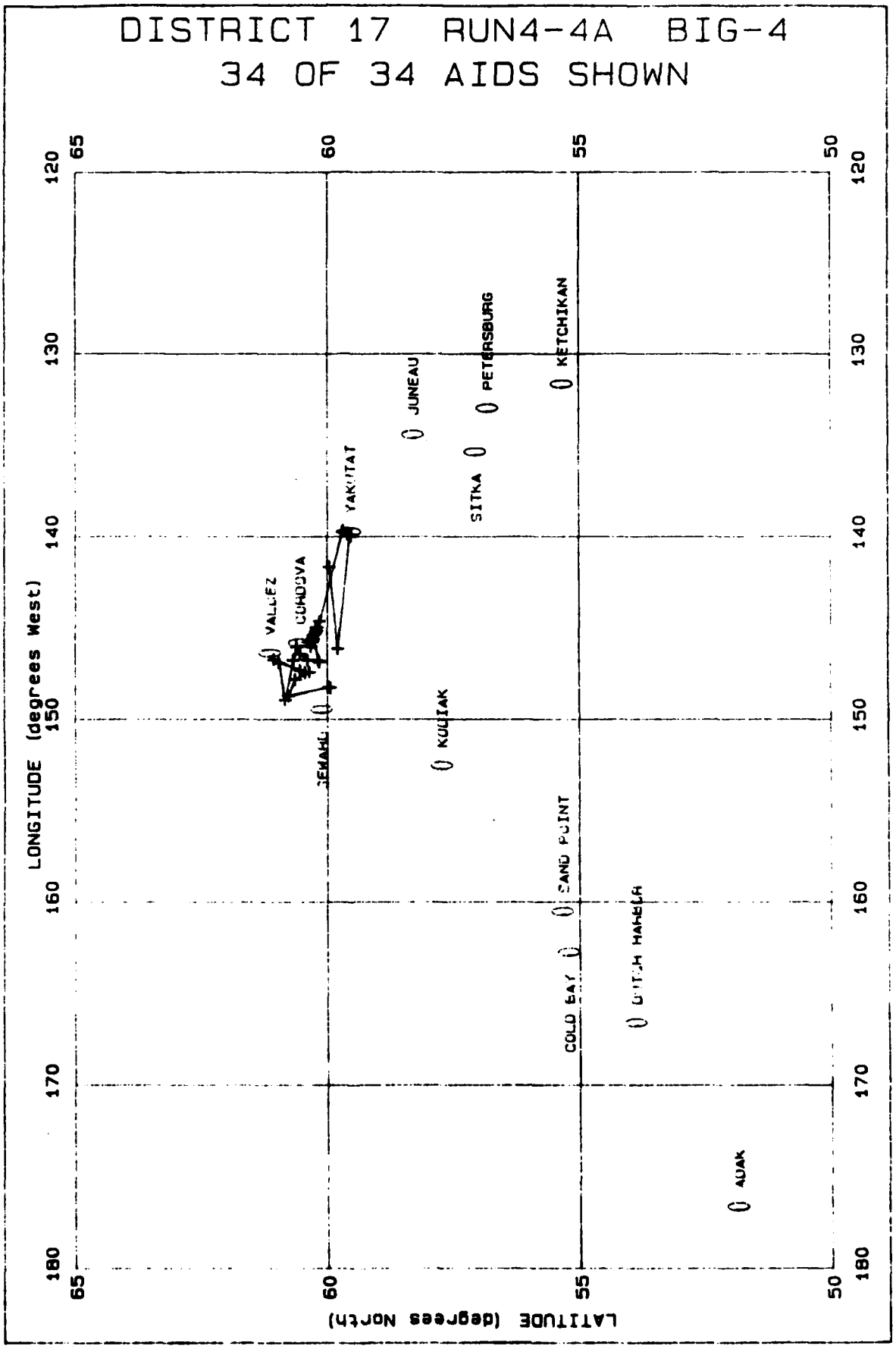

DISTRICT 17 RUN3-3 SMALL-3
141 OF 141 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
VALDEZ
CORDOVA
YAKUTAT
JUNEAU
SITKA
PETERSBURG
KETCHIKAN
KODIAK
ADAK

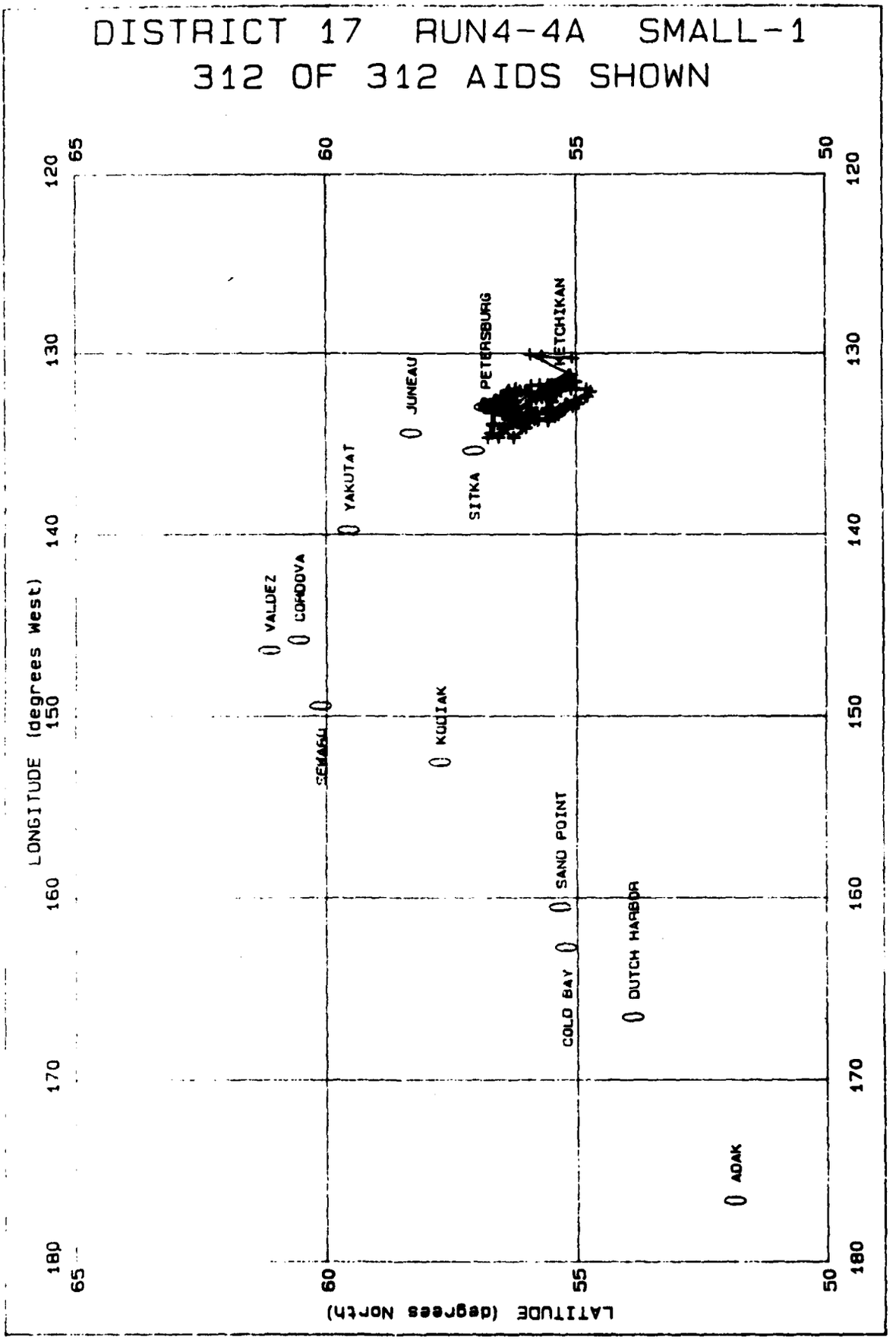

DISTRICT 17 RUN3-3 SMALL-4
59 OF 59 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
KETCHIKAN
PETERSBURG
JUNEAU
SITKA
YAKUTAT
VALDEZ
CORDOVA
KODIAK
COLD BAY
ADAK

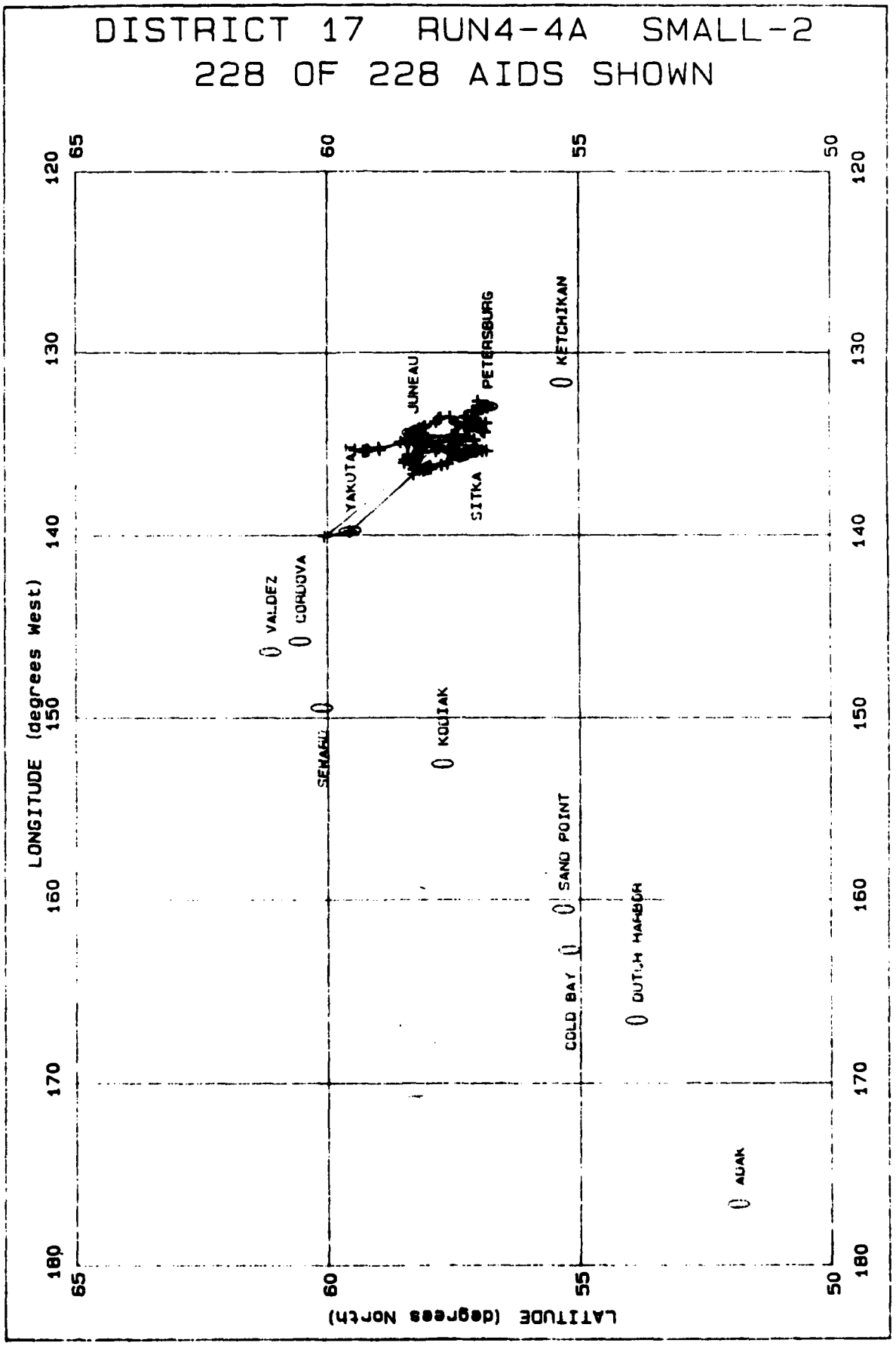

DISTRICT 17 RUN4-4A BIG-1
43 OF 43 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
YAKUTAT
JUNEAU
SITKA
PETERSBURG
KETCHIKAN
VALDEZ
KODIAK
ADAK

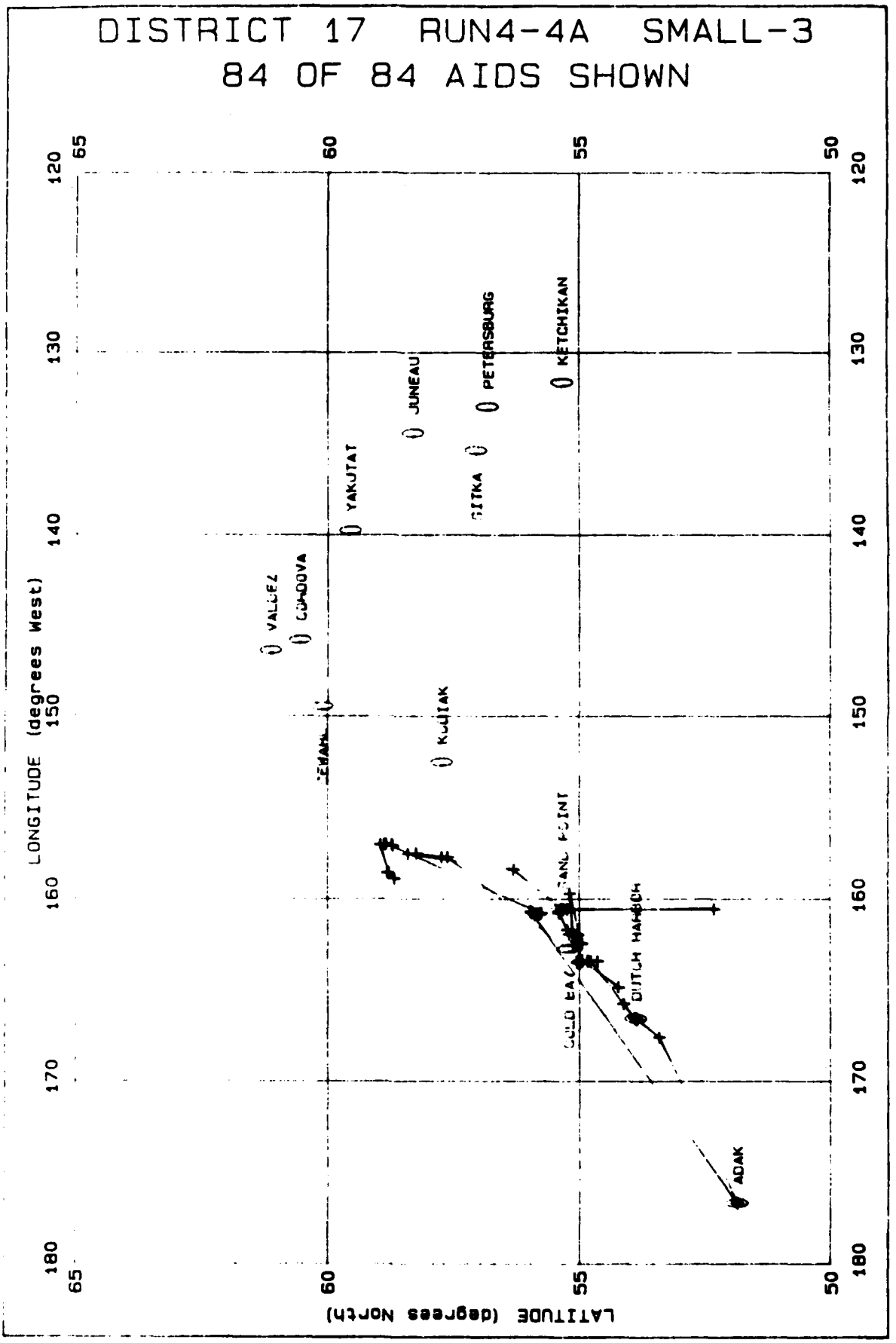

DISTRICT 17 RUN4-4A BIG-2
128 OF 128 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
120
130
140
150
160
170
180
65
60
55
50
YAKUTAT
JUNEAU
SITKA
PETERSBURG
KETCHIKAN
VALDEZ
CORDOVA
SEWARD
KODIAK
SAND POINT
COLD BAY
DUTCH HARBOR
ADAK

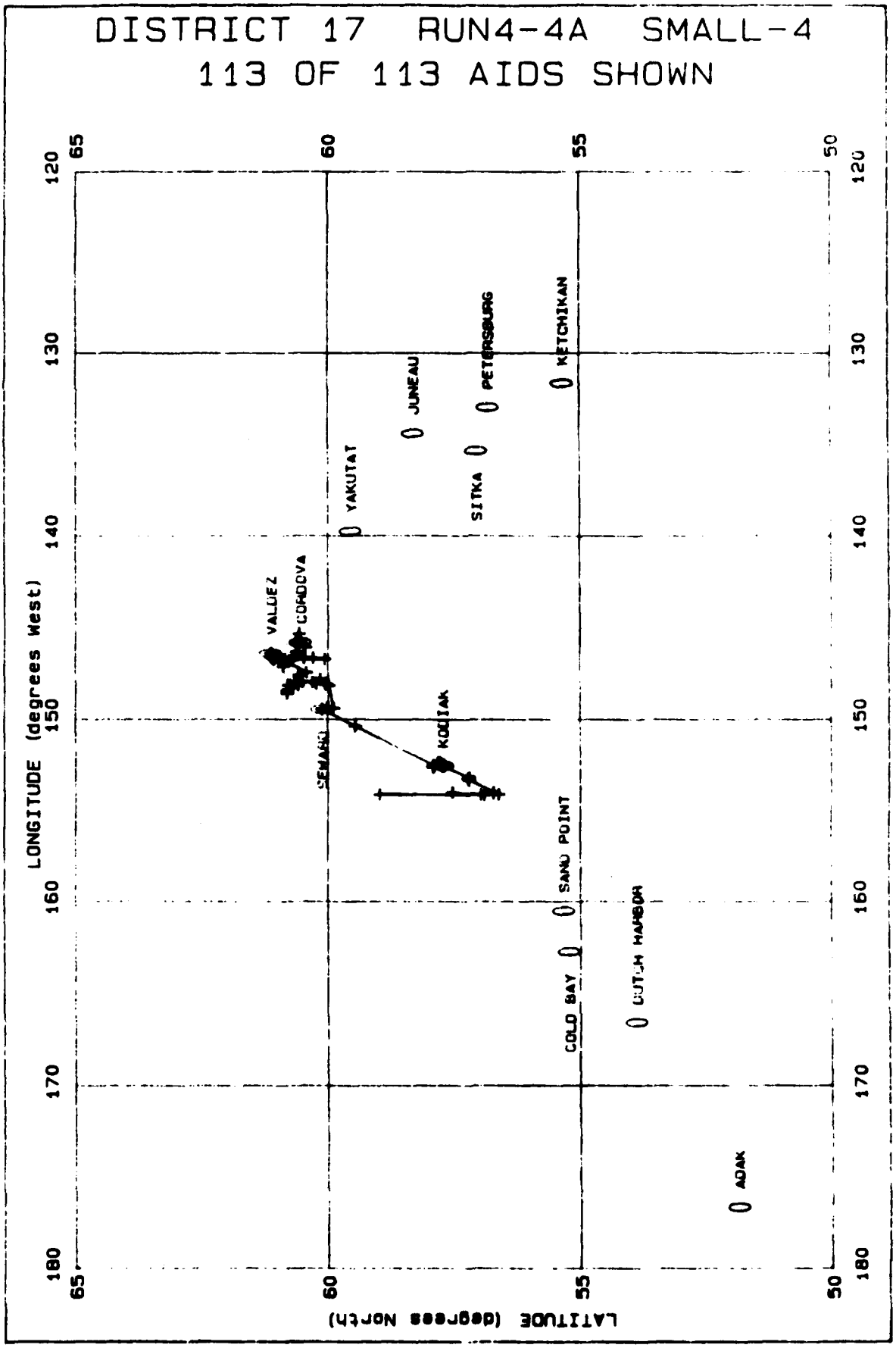

DISTRICT 17 RUN4-4A BIG-3
50 OF 50 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
KETCHIKAN
PETERSBURG
JUNEAU
SITKA
YAKUTAT
CORDOVA
VALDEZ
SEWARD
KODIAK
SAND POINT
COLD BAY
DUTCH HARBOR
ADAK


DISTRICT 17 RUN4-4A BIG-4
34 OF 34 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
120
130
140
150
160
170
180
65
60
55
50
JUNEAU
PETERSBURG
KETCHIKAN
SITKA
YAKUTAT
VALDEZ
KODIAK
COLD BAY
SAND POINT
ADAK


DISTRICT 17 RUN4-4A SMALL-1
312 OF 312 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
KETCHIKAN
PETERSBURG
JUNEAU
SITKA
YAKUTAT
VALDEZ
COHOOVA
SEWARD
KODIAK
SAND POINT
COLD BAY
DUTCH HARBOR
ADAK


DISTRICT 17 RUN4-4A SMALL-2
228 OF 228 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
JUNEAU
PETERSBURG
KETCHIKAN
YAKUTAT
SITKA
VALDEZ
CORDOVA
SEWARD
KODIAK
SAND POINT
COLD BAY
DUTCH HARBOR
ADAK


DISTRICT 17 RUN4-4A SMALL-3
84 OF 84 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
YAKUTAT
JUNEAU
PETERSBURG
KETCHIKAN
CORDOVA
KODIAK
DUTCH HARBOR
ADAK


DISTRICT 17 RUN4-4A SMALL-4
113 OF 113 AIDS SHOWN
LONGITUDE (degrees West)
LATITUDE (degrees North)
65
60
55
50
120
130
140
150
160
170
180
KETCHIKAN
PETERSBURG
JUNEAU
SITKA
YAKUTAT
VALDEZ
CORDOVA
KODIAK
SEWARD
SAND POINT
COLD BAY
DUTCH HARBOR
ADAK

END

DATE

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